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MILITARY KNOWLEDGE HANDBOOK FOR COMMANDERS

(Selected Section)

by

Xu Der Shan

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HUMAN TRANSLATION

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(Selected Section)

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PORTION OF PROTECTION AGAINST NUCLEAR, CHEMICAL, BIOLOGICAL WEAPONS

FIRST, NUCLEAR WEAPONS

I. Introduction of Nuclear Weapons

(I) Basic principles of nuclear weapons*

(1	核武器	(2凡是利用原子核反应瞬间放出的巨大能量，起杀伤破坏作用的武器，叫核武器。原子弹、氢弹、中子弹统称核武器。 (2)
(3	原子弹	(4原子弹是利用重原子核裂变反应放出的巨大能量，起杀伤破坏作用的武器。它主要由核装料（铀^{235}或钚^{239}）、炸药、起爆装置、弹体等组成。 (4)
(5)	氢·弹	(6氢弹是利用轻原子核聚变反应放出的巨大能量，起杀伤破坏作用的武器。由于氢原子核需要在极高的温度下才能发生聚变反应，所以氢弹又叫热核武器。它主要由热核装料（氘化锂）、起爆装置、弹体等组成。
(7	中子弹	(8中子弹又叫加强辐射弹，它是利用核聚变反应产生大量的中子来杀伤人员的战术核武器。它是在氢弹基础上发展起来的，属于核武器的第三代（第一代原子弹，第二代氢弹）。

Key: (1) Nuclear weapons; (2) Any weaponry which employ the enormous energy released at the instant of atomic nuclear reaction to result in casualty and damage-inflicting effects are called nuclear weapons. Atomic bomb, hydrogen bomb and neutron bomb are jointly called nuclear weapons; (3) Atomic bomb; (4) Atomic bomb is a weapon which employs the enormous energy released by nuclear fission reaction of heavy atoms to result in casualty and damage-inflicting effects. It is primarily composed of nuclear charging (uranium^{235} or plutonium^{239}), dynamite, detonating device and bomb body, etc.; (5) Hydrogen bomb; (6) Hydrogen bomb is a weapon which employs the enormous energy released by nuclear fusion reaction of light atoms to result in casualty and damage-inflicting effects. Since hydrogen nucleus requires an extremely high temperature in order for fusion to take place, hydrogen bomb is also called thermonuclear weapon. It is primarily composed of thermonuclear device (lithium deuteride), detonating device and bomb body, etc.; (7) Neutron bomb; (8) Neutron bomb is also called enhanced radiation bomb. It is a tactical nuclear weapon which employs the large quantity of neutrons generated by nuclear fusion reaction to inflict casualty on personnel. It was developed on the basis of hydrogen bomb and belongs to the third generation of nuclear weapons (the first generation being the atomic bomb, the second generation being the hydrogen bomb).

(II) Power of nuclear weapons and their classifications

1. Power of nuclear weapons. It is generally expressed as the "TNT equivalent weight" (or called equivalent weight for short). The equivalent weight of a nuclear bomb indicates that the energy released when it explodes is equivalent to the energy released when a certain weight of TNT dynamite explodes. For example, an atomic bomb of 20 kilo-ton equivalent weight indicates that the energy released when it explodes is equivalent to the energy released when 20 kilo-ton of

dynamites explode, rather than the weight of the bomb body itself. The casualty and damage-inflicting radius of a nuclear weapon increases as its equivalent weight increases, but not in a proportional increase corresponding to the multiplier of equivalent weight increase. Generally when the equivalent weight of a nuclear weapon increases 8 times the casualty and damage-inflicting radius of shock waves will increase 1 time, and even if the equivalent weight of nuclear weapon increases by one hundred-fold its casualty and damage-inflicting radius will only increase several times.

2. Classifications of power of nuclear weapons

(1)国别	(3) 中国	(8) 苏联	(13) 美国
(2)类别	(4)小型，2万吨以下 (5)中型，2万—10万吨 (6)大型，10万—50万吨 (7)特大型，50万吨以上	(9)小型，1.5万吨以下 (10)中型，1.5万—10万吨 (11)大型，10万—50万吨 (12)特大型，50万吨以上	(14)超低当量型，1千吨以下 (15)低当量型，1千—1万吨 (16)中当量型，1万—5万吨 (17)高当量型，5万—50万吨 (18)超高当量型，50万吨以上

Key: (1) Nationality; (2) Type; (3) China; (4) Small model; under 20 kilo-ton; (5) Medium model; 20 kilo-ton -- 100 kilo-ton; (6) Large model; 100 kilo-ton -- 500 kilo-ton; (7) Extra large model; over 500 kilo-ton; (8) Soviet Union; (9) Small model; under 15 kilo-ton; (10) Medium model; 15 kilo-ton -- 100 kilo-ton; (11) Extra large model; over 500 kilo-ton; (12) United States; (13) Super-low equivalent weight model; under 1 kilo-ton; (14) Low equivalent weight model; 1 kilo-ton -- 10 kilo-ton; (15) Medium equivalent weight model; 10 kilo-ton -- 50 kilo-ton; (16) High equivalent weight model; 50 kilo-ton -- 500 kilo-ton; (17) Super-high equivalent weight model; over 500 kilo-ton

(III) Ways of detonation and casualty and damage targets of nuclear weapons

(1)空中爆炸	(2)低空	(5)一般指火球不接触地面的爆炸	(6)主要用来破坏较坚固的地面、浅地下目标（野战工事、集群坦克、机库、交通枢纽、人防工事等）和杀伤野战工事内的人员。它所形成的地面沾染对部队行动有一定的影响。
	(3)中、高空		(7)主要用来杀伤地面暴露人员和破坏不坚固的目标(武器装备、机场设施、城市地面建筑等)。它所形成的地面沾染很轻，对部队行动没有影响。
	(4)超高空		(8)主要用来摧毁飞行中的导弹、火箭，对地面上的人员物体无杀伤破坏作用。
(9)地面爆炸		(10)指火球接触地面的爆炸	(11)主要用于破坏地面或浅地下的坚固目标(地下指挥所、导弹发射井、水备工事、地下铁道等)，并能造成严重的地面沾染。也可形成弹坑。影响部队的战斗行动。在相同条件下，对地面上的人员、武器装备的杀伤破坏范围，通常不如空爆时大。
(12)地下爆炸		(13)在一定深度的爆炸	(14)主要用于破坏地下重要的工程设施（坑道、地下水备工事、导弹地下发射基地等）或堵塞关卡隘路。能造成较大弹坑，形成严重的地面沾染，妨碍部队的行动。

Key: (1) Detonation in the air (air detonation); (2) Low altitude; (3) Medium, high altitude; (4) Super-high altitude; (5) Generally means detonation with the fireball not touching the ground; (6) It is primarily used to destroy stronger ground, shallow underground targets (field defense works, tank clusters, aircraft hangars, transportation hubs, people's air defense works, etc.) and inflict casualties on personnel inside field defense works. Ground contamination created by it has definite effects on the movement of troops; (7) It is primarily used to inflict casualties on exposed ground personnel and destroy targets that are not strong (weaponry, airport facilities, city ground construction, etc.). Ground contamination created by it is very light and has no effects on the movement of troops; (8) It is primarily used to destroy guided missiles and rockets in flight. It has no casualty and damage-inflicting effects on personnel and objects on the ground; (9) Ground detonation; (10) It means detonation with the fireball touching the ground; (11) It is primarily used to destroy strong ground or shallow underground targets (underground command posts, guided missile launching silos, permanent defense works, subways, etc.), and cause severe ground contaminations. It can also create crators to hamper troops combat movement. Under the same conditions, the casualty and damage-inflicting range for personnel and weaponry on the ground is normally not as large as that of air detonation; (12) Underground detonation; (13) It means detonation at a specific depth; (14) It is primarily used to destroy vital underground facilities (tunnels, permanent underground defense works, underground guided missiles launching bases, etc.) or block narrow passages. It can create a larger crator and severe ground contamination to hamper troop movement.

II. Casualty and damage-inflicting factors of nuclear weapons

杀伤破坏因素	(2)特性	(3) 效应
(4)光辐射	(5)传播速度快	(6)光辐射和普通光一样以光速（30万公里/秒）直线传播。它可以被物质（物体）吸收、反射和遮挡，并能透过透明物体。
	(7)热效应强	(8)光辐射的能量很大，被物体吸收后，主要转变为热能，使其温度升高。如当量100万吨的核爆炸，在距爆心投影点3公里的距离上，可使钢铁和地表面熔化，木制品等炭化。
	(9)作用时间短	(10)光辐射的作用时间一般只有零点几秒至几十秒。时间虽短，但也有一个过程，当发现闪光时，若能及时防护，仍可减轻伤害。
	(11)受天气地形的影响较大	(12)光辐射通过空气、雾、云、雨等都能使其能量减弱。当核爆炸发生在云层上方或云层中时，由于云层的吸收和散热作用，地面上的光辐射能量将减弱；在云层下方时，由于云层的反射作用，地面上的光辐射能量将增强。水面、冰、积雪或沙地都能反射光辐射，增强光辐射的作用。在横向沟壕、峡谷或高地、山地背向爆心的一面，光辐射的直射可部分或全部被遮挡。
(13)冲击波	(14)传播速度快	(15)冲击波从爆心以超音速（音速约340米/秒）向四周传播，随距离的增大，传播速度逐渐减慢，直至消失。如当量为1万吨的核弹空爆时，冲击波到达1公里处约需2秒，到达2公里处约需4.7秒，到达3公里处的需7.5秒。
	(16)压力强	(17)冲击波到达时，人和物体会同时受到超压的挤压作用和动压的冲击作用。冲击波内超过正常大气压的那部分压强叫超压，高速运动气流的冲击压强叫动压。
	(18)受地形影响较大	(19)冲击波遇到各种地形地物（如高地、土丘、建筑物等）时，在朝向爆心的正面，受阻而形成反射，使超压增大；冲击波从两侧和顶部绕过时，在背面形成减压区；汇合后，超压又会增加，形成增压区。谷地、凹地、壕沟等地形背向爆心的一侧，压力减弱，对向爆心时，压力增大。因此，利用地形地物时，应尽量利用背向爆心的减压（遮蔽）区进行防护。

Key: (1) Casualty and damage-inflicting factors; (2) Characteristics; (3) Effects; (4) Ray radiation; (5) Fast propagation speed; (6) Ray radiation propagates in a straight line at the speed of light (300 thousand kilometers/sec) just like regular light. It can be absorbed, reflected and sheltered from by substances (objects), and it can also pass through transparent objects; (7) Strong thermal effects; (8) Ray radiation has very large energy. After being absorbed by an object, it primarily converts into thermal energy to raise the object's temperature. For instance, a nuclear explosion of 1 mega-ton can cause steel and ground surface to melt and wood products, etc. to carbonize at a distance 3 kilometers from ground zero; (9) Short time of action; (10) Time of action of ray radiation is generally only from several tenths of a second to tens of seconds. Although the time is short, but it still goes through a process. When the flash of light is spotted and if physical protection is provided in time, damages can still be alleviated; (11) Greater influences by the weather and terrain; (12) Passing through air, fog, clouds, rain, etc. can all cause the energy of ray radiation to reduce. When a nuclear explosion takes place in or above the cloud layers, the energy of ray radiation on the ground will be reduced due to the absorption and heat scattering effects of the cloud layer; when it takes place below the cloud layers, the energy of ray radiation on the ground will increase due to reflection effect of the cloud layers. Water surface, ice, accumulated snow or sand can all reflect ray radiation to increase the effects of ray radiation. Direct exposure to ray radiation can be partially or completely blocked on the side of crosswise ditches, valleys or high grounds and hills facing away from ground zero; (13) Shock waves; (14) Fast propagation speed; (15) Shock waves propagate from ground zero in all directions at supersonic speed (the speed of sound is about 340m/sec), and as the distance increases the propagation speed gradually decreases until they disappear. For example, when a nuclear bomb with an equivalent weight of 10 kilo-ton explodes in the air, it takes about 2 seconds for the shock waves to reach a distance of 1 kilometer; 4.7 seconds to reach a distance of 2 kilometers; and 7.5 seconds to reach a distance of 3 kilometers; (16) Strong pressure; (17) When the shock waves arrive, human beings and objects are simultaneously subject to excess pressure compression effects and kinetic pressure impact effects. The portion of intensity of pressure inside the shock wave exceeding ordinary atmospheric pressure is called excess pressure and the impact intensity of pressure of high speed moving gas flow is called kinetic pressure; (18) Greater influences by the terrains; (19) When the shock waves run into various terrains and surface features (e.g. highlands, hills, buildings, etc.), they are blocked by the front side facing ground zero to form reflection, causing the excess pressure to increase; when shock waves go around the sides and go over the tops, reduced pressure regions are formed on the side facing away; after they converge, the excess pressure will increase again to form increased pressure regions. The pressure on sides of terrains such as valleys, sunken lands, ditches, etc. facing away from ground zero reduces whereas it increases on the sides facing ground zero. Therefore, the reduced-pressure (defiladed) regions facing away from ground zero should be used as much as possible to provide physical protection when utilizing terrains and surface features.

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(20) 早期核辐射	(21) 作用时间短	(22) 只有几秒到十几秒，丙射线强度几秒内迅速下降，中子流在1秒钟后即结束。随烟云上升，早期核辐射被空气层削弱越多，作用到地面的射线越少。因此，迅速采取防护措施，就能减少射线的照射。
	(23) 传播速度快、穿透力强	(24) 早期核辐射中的丙射线以光速、中子流以每秒几千至几万公里的速度从爆心向四周传播，具有较强的贯穿能力。在穿透物质的过程中，不断被物质吸收。物质层越厚，密度越大，其削弱作用越大。丙射线的强弱可用照射剂量表示，其单位是"伦"；被丙射线和中子作用的人员、物体所受的剂量，通常用吸收剂量表示，其单位是"拉德"。
	(25) 具有感生放射性	(26) 中子能使本来没有放射性的某些金属，如钠、钾、铝、锰、铁等产生放射性。这种放射性叫感生放射性。由于土壤中含有这些元素，因此，在中子作用下，爆区土壤中会产生感生放射性。土壤的感生放射性最强处，通常在地面下3—10厘米。感生放射性的作用时间短，且随时间的增加将逐渐减弱。
(27)	受地形影响	(28) 山地、丘陵、建筑物、壕沟等凡能起遮挡作用的各类地形地物，对早期核辐射都有不同程度的防护作用。
(29) 放射性沾染	(30) 来源多 (32)	(31) 其来源有三：一是核裂变碎片，二是感生放射性物质，三是未分裂的核装料。地爆时造成的爆区沾染主要是核裂变碎片，其次是感生放射性物质；空爆时造成的爆区沾染主要是感生放射性物质，云道区的沾染主要是核裂变碎片。
	射线种类多	(33) 能放出甲、乙、丙三种射线。
(34)	作用时间长	(35) 地爆时，地面放射性沾染作用时间长。空爆时，地面放射性沾染的作用时间比较短。
	(36) 受天气地形的影响	(37) 地面风的风向、风速大小对地面沾染的分布有一定的影响。高空风的风速对云道区的沾染分布有较大影响。下雨、下雪时，放射性灰尘可随雨、雪迅速沉降，加重地面沾染；地面流水可使放射性灰尘流入工事内和水源中，加重沾染；山谷、凹地、有植物的地面易滞留放射性灰尘，可加重沾染。
(38) 核脉电磁冲		(39) 它是核爆炸时产生的一种电磁波。它象自然界里常见的雷电。其特性是：电磁场强度高，比雷电产生的电磁信号高千百倍；频率很宽，现代电子设备几乎都要受到它的干扰、破坏；作用距离可达几百到几千公里；持续时间短，只有万分之几秒，它既能干扰电子、电器设备的正常工作，并能使其失效。它形成的附加电离区对短波天波通信影响时间较长。当量越大，爆高越高，影响越大。通信频率越高，影响越小。

Key: (20) Early-stage nuclear radiations; (21) Short time of action; (22) It only lasts from several seconds to tens of seconds, the intensity of γ-ray reduces rapidly within several seconds and neutron flow ends after 1 second. As the plume rises, the more early-stage nuclear radiations weakened by atmospheric layers, the less rays reach the ground. Therefore, to employ physical protection quickly can reduce irradiation of ray; (23) Fast propagation speed, strong penetration ability; (24) γ-ray in early-stage nuclear rays travels at the speed of light and neutron flow travels at a speed from several thousand to tens of thousand of kilometers per second to propagate from ground zero in all directions, they possess stronger penetration capability. During the process of penetrating a substance, it is constantly being absorbed by the substance. The thicker the layer of a substance, the larger its density and the stronger its weakening effect. The intensity of γ-ray may be expressed by the dosage of irradiation with "roentgen" as its unit; the dosage of γ-ray and neutron effect received by personnel and objects is generally expressed by the absorption dosage with "Rad" as its unit; (25) Possessing induced radioactivity; (26) Neutron is capable of making certain originally non-radioactive metals such as sodium, potassium, manganese, iron, etc. become radioactive. This kind of radioactivity is called induced radioactivity. Since these metals are present in soil, and as a result, the soil within explosion zone will generate induced radioactivity under the action of neutrons. The location where there is the strongest induced radioactivity in soil is generally 3-10cm under the surface. The time of action of induced radioactivity is short and it gradually weakens as time passes; (27) Influenced by terrains; (28) Various terrains and surface features such as mountainous areas, hills, buildings, ditches, etc. which exert blocking effects all have different degrees of physical protection effects; (29) Radioactive contaminations; (30) Numerous sources; (31) There are three sources: the first is nuclear fission fragments, the second is induced radioactive substances and the third is unfissioned nuclear charging. Contaminations in the explosion zone created when ground detonation is conducted primarily come from nuclear fission fragments, the induced radioactive substances come as secondary;

contaminations in the explosion zone created when air detonation is conducted primarily comes from induced radioactive substances, and the contaminations of cumulative clouds region primarily come from nuclear fission fragments; (32) Numerous types of ray; (33) Capable of emitting α, β and γ three types of ray; (34) Long time of action; (35) The time of action of ground radioactive contamination is long when air detonation is conducted. The time of action of ground radioactive contamination is shorter when air detonation is conducted; (36) Influenced by weather and terrains; (37) Ground wind direction and the magnitude of wind speed has specific influences on the distribution of ground contaminations. The wind speed of high-altitude wind has greater influences on the distribution of contaminations in the cumulative cloud layers. When it rains or snows, the radioactive fallout may descend rapidly with the rain and snow to worsen ground contamination; surface water flow can direct the radioactive fallout into defense works and water sources to worsen contaminations; radioactive fallout can easily be retained in valleys, sunken lands and ground surfaces with vegetations to worsen contaminations; (38) Nuclear electromagnetic pulse; (39) It is a kind of electromagnetic wave generated when a nuclear explosion is conducted. It resembles common thunder and lightning in nature. Its characteristics are: strong electromagnetic field intensity, hundreds and thousands times stronger than the electromagnetic signals generated by thunder and lightning; its frequency is very wide, almost all modern electronic facilities are interfered, damaged by it; distance of action may reach several hundreds to several thousand kilometers; the sustaining time is short, only several thousandths of a second, it is not only capable of interferring with normal operation of electronic and electrical facilities but can also render them useless. The attached ionization zone it forms has a longer influencing time on shortwave radio communications. The larger the equivalent weight and the higher the detonation altitude, the greater the influences. The higher the communication frequency, the smaller the influences.

III. Casualty and Damage-Inflicting effects of Nuclear Weapons

(I) Casualty of personnel inflicted by nuclear weapons

Out of the five kinds of casualty and damage-inflicting factors generated by nuclear explosions, the first four casualty-inflicting factors can all cause injuries to personnel. When a nuclear explosion over 20 kilo-ton takes place under medium visibility, ray radiation among instant casualty-inflicting factors for exposed personnel has the largest casualty-inflicting radius, that of the shock waves comes next and that of the early-stage nuclear radiations is the smallest. The casualty-inflicting radius of early-stage nuclear radiations for a nuclear explosion under 10 kilo-ton is larger than those of ray radiations and shock waves. But even for a nuclear explosion with an equivalent weight of 10 mega-ton, the casualty-inflicting radius of early-stage nuclear radiations still does not exceed 4 kilometers. In an ordinary nuclear explosion, its energy distribution is that shock waves take up the most, ray radiations come second, then come nuclear contaminations and early-stage radiations take up the least.

Injuries of personnel suffered from one kind of casualty-inflicting factor are called simple-injury; injuries suffered from more than two kinds of casualty-inflicting factors are called compound-injury. The injury conditions can be classified into four classes based upon their influences on combat capabilities and possibility of being cured: mild-degree injuries, generally there is no loss in combat capabilities and they can all be cured; medium-degree injuries, generally combat capabilities will be lost and the majority can be cured; severe-degree injuries, there may be immediate loss of combat capabilities and the majority can be cured; extremely severe-degree injuries, there will be immediate loss of combat capabilities and only a small portion can be cured.

1. Simple-injury

Impact damages. Shock waves can directly cause cerebral concussion, bone fractures, liver and spleen ruptures as well as damages to lungs, stomach, eardrum and skins, etc.; meanwhile, the collapse and damages of defense works and buildings as well as sand and rocks blown up can cause indirect injuries to personnal. Under field combat conditions, direct casualty is the main one; in urban residential areas, mountainous regions and forest regions, indirect injury is the main one with a larger range. The characteristics of injury to personnel by shock waves: the first is complicated injury conditions with not only external injuries but also organ damages; the second is mild external injuries accompanied by severe internal injuries; the third is rapid development.

Ray radiation damages. Ray radiations can cause direct burns to personnel; they can also cause clothes and other objects to burn resulting in indirect burns. When a nuclear bomb over 10 kilo-ton is air-detonated, simple-burn of exposed personnel on the ground takes up half the number; when it is ground-detonated, the smaller the equivalent weight, the smaller the percentage of burns, and the reverse is true. Direct staring of the fireball can cause personnel to suffer retina burns with a larger range than that of skin burns. The flash of light of nuclear explosion can also cause personnel to suffer flash blind (more severe during the night than the day) which can make one's eyes turn black and blurry, with vision reduced for severe cases. Generally flash blind can recover unattended within a few seconds to several hours. Once the hands and eyes of combatants suffer burns, observation and firing operation are immediately affected, even resulting in the loss of combat capabilities. The characteristics of damages to human

beings by ray radiations are: the first is orientation, butns occur mostly at exposed body parts facing ground zero; the second is more burns of eyes and respiratory tract than under regular conditions; the third is short sustaining time and superficial burn depth.

Early-stage nuclear radiations damages. After being irradiated with a large dosage of nuclear radiations, personnel may suffer radiation sickness. There are no symptoms when the one-time dosage received by personnel is smaller than 50 roentgens. The severity of radiation sickness is primarily determined by the amount of irradiation received. Its damage characteristics are: the first is that there are more severe-degree injury conditions and above than there are medium-degree injury conditions and below, about 60-70%; the second is that there is an obvious incubation period for acute radiation sicknesses, and generally they will not cause loss of combat capabilities immediately; the third is that the damage range is wide with complex symptoms.

Classification of degrees of acute radiation sickness

(1) 放射病等级	(6) 照射量(伦)	(8) 初期症状出现时间	(12) 症状
(2) 轻度	100—200	(9) 伤后几天内	(13) 骨髓造血功能轻度障碍，疲劳、头昏、失眠、食欲减退、恶心等。
(3) 中度	200—400	(10) 伤后数小时	(14) 骨髓造血功能中度障碍，有轻度出血、感染和肠胃功能紊乱，并有脱发等症状。
(4) 重度	400—600	(11) 伤后数小时	(15) 骨髓造血功能严重障碍，出血、感染和胃肠功能紊乱症状明显，毛发脱落，可发生轻度神经症状。
极重度	600以上 (7)	(12) 伤后1小时	(16) 骨髓造血功能极严重障碍，出血、感染、反复呕吐、严重腹泻，可发生中枢神经系统症状。

Key: (1) Degree of radiation sickness; (2) Mild; (3) Medium; (4) Severe; (5) Extremely severe; (6) Amount of irradiation (roentgen); (7) Over; (8) Time lapse when initial symptoms appear; (9) Within several days after being injured; (10) Within several hours after being injured; (11) Within one hour after being injured; (12) Symptoms; (13) Mild hinderance of bone marrow's blood-making function, fatigue, dizziness, insomnia, loss of appetite, nausea, etc.; (14) Medium hinderance of bone marrow's blood-making function, there are symptoms such as mild hemorrhage, infections and intestines and stomach functions disorder as well as hair loss, etc.; (15) Severe hinderance of bone marrow's blood-making function, there are obvious symptoms such as hemorrhage, infections and intestines and stomach disorder, there will be hair losses and maybe mild neurological symptons; (16) Severe hinderance of bone marrow's blood-making function, there will be hemorrhag:,

infections, repeated vomitting, severe diarrhea and maybe central nerve system symptoms.

Danger of radioactive contaminations. The damages to personnel by radioactive contamination are caused by the irradiation effects of rays on human body. There are three channels to cause damages: the first is external irradiation, which are damages caused by irradiation of rays when personnel moves about the contaminated region; the second is internal irradiation, which are damages caused by radioactive substances entering the human body through channels such as respiratory tract, esophagus or wounds, etc.; the third is skin contaminations, which are burns caused by severe skin contaminations. The characteristics of these damages: the first is that they are primarily external irradiation; the second is that the damages of one-time irradiation are more severe than those of multiple irradiation under the condition of equal total dosage; the third is that generally combat capabilities will not be lost immediately.

2. Compound-injury

Since several casualty-inflicting take effect simultaneously, unprotected personnel normally are susceptible to suffer compound-injury. Compound-injury can be classified into three types: the first type of compound-injury is primarily radioactive damages; the second type of compound-injury is primarily burns; the third type of compound-injury is primarily impact damages. The burns and impact compound-injury are primarily burns resulted from nuclear explosions over 20 kilo-ton. The characteristics of their damages on personnel are: the first is that complex injury conditions complement each other; the second is that the primary damages of compound-injury determines the development of injury conditions.

(II) Damaging effects of nuclear weapons on weapon equipment and defense works

1. Damages to weapon equipment

Damages to infantry weapons. The damage radius for infantry weapons is smaller than the casualty radius for personnel, and as long as the personnel does not lose his combat capabilities, the infantry weapon he carries is generally usable. The extent of damages to boxed ammunitions placed inside caves is very limited, similar to that of infantry weapons. Carried ammunitions will not explode spontaneously as long as the personnel is safe.

Damages to artillery. The aiming device, certain thin sheet metal and small rods of artillery with lower structural strength are susceptible to suffer damages.

Damages to trucks and tractors. The driver's cab, radiator and body of a vehicle are most susceptible to suffer damages. The heaviest damages are sustained with the front end facing ground zero sideway; facing it comes second; and the mildest damages are sustained when facing away from it.

2. Damages to defense works

Damages to field defense works. The side walls of defense works in the open are susceptible to suffer from the compression of shock waves resulting in dislocation, becoming loose, even collapse and in the meantime, they cause the cover material of defense works to be broken or tipped over. Ray radiations can cause cover material to burn. The supporting and covering structures for the defense works openings and passages are prone to be tilted, shifted, cracked, collapsed and stopped up. When the damages are severe, the three-dimensional structures will fracture and collapse.

Damages to permanent defense works. Shock waves can cause the entrance to permanent defense works collapse, creating damages to the openings and various channels and affect the usage of defense works. They can also destroy the protection doors of defense works to cause casualty and damages to personnel and equipment inside the defense works. The main body structure will form cracks and even collapse only when the damages are severe.

IV. Performance and Casualty and Damage-Inflicting Characteristics of Neutron Bombs

(I) Neutron bomb primarily depends upon high energy neutrons generated at the instant of explosion to inflict casualty on effective strengths, making personnel suffer acute radiation sickness while having very small damaging range for weapon equipment and buildings. It can effectively inflict casualties on passenters inside tanks to counter enemy's tank clusters thereby changing its superiority in regular forces.

(II) The radioactive contaminations after a neutron bomb explodes is very light

and troops can move into the explosion zone immediately. This is not only very significant militarily but can also keep the residents and cities in the explosion zone from the threats of radioactive contaminations.

(III) Neutron bomb is a good weapon for intercepting guided missiles and destroying an air fleet. Neutrons can penetrate the outer shell of a guided missile to cause the nuclear fuel to generate fission and exothermic deforms thereby rendering the weapon useless as well as making electronic instruments out of control or the nuclear weapon detonate prematurely.

(IV) The equivalent weight of neutron bomb is small, about 1-2 kilo-ton, and it can be delivered using various means of delivery. If it is used as a tactical support weapon, it can be shelled and dropped employing methods such as artillery shells, guided missiles, bombs, etc., making it flexible and mobile.

(V) Neutron bomb has a greater degree of difficulty in terms of physical protection. To guard against neutron radiation, not only multiple-component materials are required but they should also have specific thickness to weaken and absorb it progressively; therefore, its degree of difficulty to guard against is large.

V. Casualty and Damage-Inflicting Characteristics of Nuclear Weapons

(I) The casualty and damage-inflicting factors are numerous. Nuclear explosion can generate five kinds of casualty and damage-inflicting factors such as ray radiations, shock waves, early-stage nuclear radiation, radioactive contaminations and electromagnetic pulses. The majority of targets will be subject to simultaneous effects of several factors, making casualties and damages even more complicated.

(II) The casualty and damage-inflicting range is wide. The casualty-inflicting range of a nuclear bomb with an equivalent weight of 1 kilo-ton for exposed personnel in an open area is about equivalent to seven artillery battalions (five 155 mm artillery battalions and two 203 mm artillery battalions) conducting a salvo with regular, modern artillery shells. The casualty-inflicting area for foxholes and personnel inside tanks is 20 to 30 times that of the aforementioned salvo of seven artillery battalions.

(III) The extents of casualty and damages are severe. When a nuclear bomb with an

equivalent weight of 12 kilo-ton is ground-detonated, tanks at 200 meters from ground zero are thrown off 15 meters by the shock waves causing severe damages to them when their bodies hit the ground. For a fork-shaped tunnel 40 meters under ground zero, sections within 51 meters from ground zero in the south section and 42 meters from ground zero in the west section are completely destroyed, and animals inside the tunnel are all dead.

(IV) The period of radioactive contamination is long. One hour after a nuclear bomb with an equivalent weight of 12 kilo-ton explodes, the highest irradiation rate of the ground near ground zero reaches 43,000 roentgens/hour, the boundary of trace-plume region with a ground irradiation rate of 100 roentgens/hour reaches 10 kilometers and the time of action lasts as long as from several days to dozens of days, possibly even sustaining for months.

VI. Casualty-Inflicting Radius (Kilometer) of Nuclear Weapons for Exposed Personnel in Open Areas

(1) 伤情等级	(5) 1千吨		(8) 2千吨		(9) 5千吨		(10) 1万吨		(11) 2万吨		(12) 5万吨		(13) 10万吨		(14) 20万吨		(15) 50万吨	
	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆	(6) 地爆	(7) 空爆
(2) 极重度	0.72	0.71	0.79	0.78	0.91	0.89	1.02	1.00	1.15	1.12	1.35	1.33	1.55	1.87	1.84	2.63	2.82	4.07
(16) 重度	0.78	0.78	0.86	0.85	0.98	0.97	1.10	1.08	1.23	1.20	1.43	1.81	1.69	2.49	2.40	3.46	3.69	5.27
(3) 中度	0.87	0.87	0.95	0.94	1.07	1.06	1.19	1.18	1.34	1.52	1.58	2.33	2.19	3.21	3.05	4.41	4.65	6.55
(4) 轻度	0.98	0.98	1.06	1.05	1.19	1.18	1.32	1.32	2.05	3.05	3.00	4.20	3.90	5.60	5.04	7.16	6.96	10.2

Key: (1) Degree of injury conditions; (2) Extremely severe-degree; (3) Medium-degree; (4) Mild-degree; (5) 1 kilo-ton; (6) Ground detonation; (7) Air detonation; (8) 2 kilo-ton; (9) 5 kilo-ton; (10) 10 kilo-ton; (11) 20 kilo-ton; (12) 50 kilo-ton; (13) 100 kilo-ton; (14) 200 kilo-ton; (15) 500 kilo-ton; (16) Severe-degree.

VII. Casualty-Inflicting Radius (Kilometer) of Nuclear Weapons for Personnel Inside Medium Tanks

伤情等级	1千吨		2千吨		5千吨		1万吨		2万吨		5万吨		10万吨		20万吨		50万吨	
	地爆	空爆	地爆	空爆	地爆	空爆	地爆	空爆	地爆	空爆	地爆	空爆	地爆	空爆	地爆	空爆	地爆	空爆
极重度	0.43	0.44	0.49	0.50	0.59	0.59	0.69	0.67	0.80	0.77	0.98	0.90	1.21	1.07	1.36	1.25	1.58	1.40
重度	0.48	0.49	0.54	0.55	0.65	0.64	0.74	0.73	0.85	0.83	1.02	0.97	1.23	1.15	1.55	1.26	2.10	1.71
中度	0.57	0.58	0.63	0.64	0.74	0.74	0.84	0.84	0.96	0.95	1.26	1.11	1.59	1.29	2.00	1.58	2.71	2.14
轻度	0.66	0.68	0.73	0.74	0.84	0.85	0.95	0.96	1.07	1.07	1.34	1.24	1.69	1.45	2.13	1.83	2.89	2.48

Key: All terms in Chinese are identical and correspond to those in Table VI.

VIII. Medium Damage-inflicting radius (kilometer) of Nuclear Weapons for Various Targets

(1)爆炸方式	(2)地爆										(3)空爆									
(4)当量(千吨)	1	2	5	10	20	50	100	200	500	1000	1	2	5	10	20	50	100	200	500	1000
(5)59式中型坦克	0.13	0.17	0.25	0.32	0.42	0.60	0.78	1.05	1.46	1.90	0.09	0.12	0.17	0.23	0.31	0.45	0.59	0.80	1.17	1.60
(6)62式轻型坦克	0.19	0.24	0.33	0.42	0.54	0.75	0.95	1.23	1.70	2.20	0.15	0.19	0.27	0.35	0.42	0.62	0.81	1.05	1.46	1.90
(7)63式装甲车	0.22	0.28	0.38	0.49	0.63	0.87	1.10	1.40	1.93	2.46	0.19	0.24	0.34	0.44	0.56	0.78	1.00	1.29	1.79	2.32
(8)无坐力炮	0.23	0.30	0.43	0.55	0.71	0.99	1.25	1.62	2.22	2.85	0.20	0.28	0.40	0.54	0.70	0.99	1.25	1.62	2.25	2.92
(9)迫击炮	0.20	0.28	0.41	0.53	0.70	0.97	1.22	1.58	2.18	2.80	0.16	0.24	0.37	0.51	0.67	0.95	1.20	1.54	2.17	2.83
(10)炮兵观测器材	0.25	0.34	0.50	0.66	0.88	1.26	1.63	2.16	3.08	4.20	0.24	0.34	0.51	0.70	0.93	1.35	1.78	2.30	3.35	4.48
(11)载重汽车	0.26	0.33	0.47	0.61	0.78	1.08	1.37	1.78	2.50	3.20	0.25	0.33	0.46	0.62	0.79	1.11	1.45	1.83	2.65	3.40
(12)掩壕	0.28	0.34	0.46	0.58	0.74	1.00	1.25	1.60	2.16	2.74	0.27	0.34	0.46	0.58	0.72	1.00	1.25	1.58	2.15	2.75
(13)坑孔	0.22	0.28	0.37	0.46	0.59	0.80	1.01	1.28	1.71	2.15	0.19	0.24	0.32	0.40	0.50	0.69	0.87	1.10	1.46	1.88
(14)避弹所	0.25	0.31	0.42	0.53	0.67	0.91	1.15	1.45	1.95	2.45	0.23	0.29	0.39	0.50	0.62	0.84	1.07	1.33	1.80	2.30
(15)轻型掩蔽部	0.22	0.28	0.34	0.46	0.58	0.80	1.00	1.28	1.70	2.30	0.19	0.24	0.32	0.40	0.50	0.68	0.86	1.10	1.45	1.85
(16)加强型掩蔽部	0.16	0.21	0.29	0.35	0.44	0.60	0.77	0.95	1.28	1.63	0.12	0.15	0.21	0.27	0.33	0.45	0.56	0.72	0.96	1.20

Key: (1) Detonation patterns; (2) Ground detonation; (3) Air detonation; (4) Equivalent weight (kilo-ton); (5) Model 59 medium tank; (6) Model 62 light tank; (7) Model 63 armored vehicle; (8) Recoilless gun; (9) Mortar; (10) Artillery observation equipment; (11) Truck; (12) Trench; (13) Cave; (14) Foxhole; (15) Light shelter; (16) Reinforced shelter.

IX. Classification of Contaminated Zones and Their Influences on Troop Movements

(1)沾染区的划分	(6)进入沾染区时的地面照射率(伦/时)	(8)进入沾染区的时间(爆后小时)	(9)停至爆后24小时的照射量(伦)	(10)长期停留的照射量(伦)	(11)体外照射对部队行动的影响程度
(2)轻微	2—10	0.5	2.3—12	3.8—19	(12)适当注意活动时间，可徒步通过。
		1	4.0—20	6.7—33	
		6	14—68	40—200	
(3)中等	10—50	0.5	12—58	19—95	(13)需要限制活动时间，可徒步或乘车通过。
		1	20—100	33—170	
		6	68—340	200—1000	
(4)严重	50—100	0.5	58—120	95—190	(14)严格控制活动时间，应乘车通过。
		1	100—200	170—330	
		6	340—680	1000—2000	
(5)极严重	(7)100以上	0.5	120以上(7)	190以上(7)	(15)尽量避免在该区活动，应迂回通过，或乘装甲车辆迅速通过。
		1	200以上(7)	330以上(7)	
		6	680以上(7)	2000以上	
(16)备注	(17)1.表中照射剂量，左边的数值对应于剂量率的下限，右边的数值对应于剂量率的上限。 (18)2.战时人员辐射控制剂量，一次全身照射为50伦(间隔30天后，方可再次受照射)，年积累照射剂量为150伦，终身照射剂量为250伦。				

Key: (1) Classification of contaminated zones; (2) Mild; (3) Medium; (4) Severe; (5) Extremely severe; (6) Ground irradiation rate at the time entering contaminated zone (roentgen/hour); (7) Above 100; (8) Time entering contaminated zone (hours after detonation); (9) Irradiation quantity received staying until 24 hours after detonation (roentgen); (10) Irradiation quantity received for long-term staying (roentgen); (11) Extent of influence on troops movement from external irradiation; (12) Pay proper attention to time of movement, passing through on foot is allowed; (13) Time of movement needs to be limited, passing through on foot or in vehicles is allowed; (14) Time of movement is strictly limited, passing through should be in vehicles; (15) Avoid any movement in the said region as much as possible, passing through should be detoured or in armored vehicle quickly; (16) Remarks; (17) 1. For the irradiation dosages in the table, the value on the left-hand side corresponds to the lower limit of dosage rate and the right-hand value corresponds to the upper limit of dosage rate; (18) 2. For the radiation controlled dosages for combatants, the one-time general irradiation is 50 roentgens (another irradiation can only be received after 30 days), the annual accumulated irradiation dosage is 150 roentgens, and the life-time irradiation dosage is 250 roentgens.

SECOND, CHEMICAL WEAPONS

I. Introduction of Chemical Weapons

(I) What are chemical weapons*

Chemical substances used in warfare to poison human beings, animals are called military toxic agents (called agents for short). Various artillery shells, bombs, rockets, guided missiles, poisonous gas jars, hand grenades, mines and spreaders (sprayers), etc. filled with agents are jointly called chemical weapons.

(II) Combat state of agents

The state in which agents generate casualty-inflicting effects after the application of chemical weapons is called the combat state. The combat state of agents includes five types such as state of steam, mist, smoke, droplet and powder. Mist and smoke are jointly called gas sol.

Steam state Agents evaporate as gas molecules to be dispersed in the air.

Mist state Agents disperse as liquid particles to be suspended in the air.

Smoke state Agents disperse as solid particles to be suspended in the air.

Droplet state Agents disperse as liquid to be spread on the ground and objects.

Powder state Agents turn into powder to be spread on the ground or floating in the air.

After the application of agents, some are in one combat state while others are in several combat states simultaneously with a certain one as the main state. The agent cloud cluster generated at the instant the chemical bomb explodes or the one formed by the spreader is called primary cloud cluster; the agent cloud cluster evaporated from contaminated ground and objects is called regenerated cloud cluster. These two cloud clusters can both contaminate the air within a specific range.

(III) Classification of agents*

按毒理作用分类(1)	(2)神经性毒剂 是破坏神经系统正常功能的毒剂，也叫含磷毒剂。主要有沙林、梭曼、维埃克斯。 (3)糜烂性毒剂 是使细胞坏死，组织溃烂的毒剂。主要有芥子气、路易氏气。 (4)全身中毒性毒剂 是破坏组织细胞氧化功能，使全身缺氧的毒剂。主要有氢氰酸。 (5)失能性毒剂 是使人的思维和运动机能发生障碍，暂时失去战斗力的毒剂。主要有毕兹等。 (6)窒息性毒剂 是伤害肺部，使人缺氧窒息的毒剂。主要有光气。 (7)刺激性毒剂 是直接刺激眼睛、上呼吸道和皮肤的毒剂。主要有苯氯乙酮、亚当氏气、西埃斯。 (8)此外，美军曾大量使用过植物杀伤剂（也叫除莠剂）。如橙色、白色、蓝色混合物，木牛龙，敏罗马等。

Key: (1) Classification based upon toxicological effects; (2) Nerve agents. They are agents which damage the normal functions of nerve systems, also known as phosphorus-containing agents. The main ones are salin(?), soman(?), VX; (3) Vesicant agents. They are agents which cause necrosis in cells and fester in organisms. The main ones are mustard gas, Louis' gas; (4) General poisoning agents. They are agents which destroy the oxidation function of organisms and cells to cause general oxygen defficiency. The main one is hydrocyanic acid; (5) Incapacitating agents They are agents which cause hindrance to people's chain of thought and motive mechanisms to temporarily lose combat capabilities. The main ones are BZ, etc.; (6) Asphyxiating agents They are agents which hurt the lungs to cause oxygen defficiency and asphyxiation. The main one is phosgene; (7) Irritant agents They are agents which directly irritate the eyes, upper respiratory tract and skins. The main ones are benzochloric ethylketone, Adam's gas, CS; (8) In addition, the U.S. forces had used vegetation killers in great quantities (also called herbicides). Such as orange, white, blue mixture, muniulong(?), polomagin(?), etc.

Continued table

(10)战术(12)使用(14)分类	按造成人员伤亡分类(11)	致死性毒剂 这类毒剂的毒性大，主要用于杀伤对方有生力量，削弱对方战斗力。如沙林、梭曼、氢氰酸、光气等。当人员吸入高浓度神经性、全身中毒性毒剂的蒸气或气溶胶时，1分钟内即可致命。 在致死性毒剂中，又可分为速杀性毒剂和非速杀性毒剂。前者是中毒后很快出现症状并引起死伤的毒剂，如沙林、梭曼、氢氰酸等；后者是中毒后经一定的潜伏期才出现症状并引起伤害的毒剂，如光气。 非致死性毒剂 这类毒剂使用后，不在很高浓度下，一般不会造成死亡，但常能引起躯体或神经失能，使对方迅速出现暂时降低战斗力的现象，如亚当氏气、毕兹、芥子气等。这类毒剂虽不能造成死亡，但利用其快速或持久作用，能迅速影响对方战斗行动，从而给使用者造成优势。
	按杀伤作用快慢分类(13)	速效性毒剂 这类毒剂，能使人很快出现毒害症状，使对方迅速致死或暂时失能而丧失战斗力。如沙林、维埃克斯、氢氰酸、苯氯乙酮、毕兹等。当人员吸入大量氢氰酸后，几秒钟内即惶惑晕眩，半分钟内失去知觉，1分钟即停止呼吸。当人员遭受刺激性毒剂袭击，1至2分钟内即可出现不可耐状。若突然用于对各种火力点、坦克和装甲输送车等袭击，是比较有效的。 缓效性毒剂 这类毒剂中毒后，其中毒症状通常在1至数小时后才出现，经过一定的潜伏期，才影响对方的战斗力。如芥子气、路易氏气、光气等。
	按杀伤作用持续时间分类(15)	暂时性毒剂 这类毒剂使用后，通常成气、雾、烟状，主要使空气染毒，其杀伤作用时间短，从几分钟至几十分钟。如沙林、氢氰酸和呈烟状使用的毕兹、苯氯乙酮、亚当氏气、西埃斯等。 持久性毒剂 这类毒剂使用后，通常成液滴状或粉末状，主要使地面、物体、水源染毒，部分也可造成气雾状使空气染毒。其杀伤作用持续时间长，一般在几小时至几天。如梭曼、维埃克斯、芥子气、路易氏气等。 毒剂杀伤作用的持续时间，除了决定于毒剂本身的性质外，还与当时气温和使用方法有关。如沙林在气温高时，持续时间短；气温低时，持续时间长。又如芥子气呈液滴状使用时，持续时间长；呈气雾状使用时，持续时间短。同样苯氯乙酮、亚当氏气等刺激性毒剂通常作暂时性毒剂使用，当它以粉末状大量布撒在地面，造成地面和空气长时间染毒，即成为持久性毒剂。

Key: (9) Classification based upon tactical utilizations; (10) Classification based on casualties inflicted on personnel; (11) Lethal agents This type of agents has high toxicity, and is primarily used to inflict casualty on the enemy's effective strength and weaken the enemy's combat capabilities. Such as salin, soman, hydrocyanic acid, phosgene, etc. When personnel inhales steam or gas sol of highly concentrated nerve, general poisoning agents, they can cause death within just one minute. Among lethal agents, they can be further classified into fast-killing and nonfast-killing agents. The former are agents which display symptoms and cause casualties very shortly after being exposed to, such as salin, soman, hydrocyanic acid, etc; the latter are agents which display symptoms and cause damages only after undergoing a specific incubation period after being exposed to, such as phosgene. Nonlethal agents After the application of this type of agents, it is normally not fatal unless under an extremely high concentration; but it can generally cause incapacity of the body or nerve, making the enemy quickly show temporary phenomena of decrease in combat capabilities, such as Adam's gas, BZ, mustard gas, etc. This type of agents does not cause death, but the enemy's combat capabilities can be rapidly affected by employing its fast or sustaining effects, thereby giving the user a dominant position; (12) Classification based upon the speed of inflicting casualties; (13) Fast-acting agents This type of agents can very quickly make the enemy show poisoning symptoms, promptly cause death or temporary incapacity followed by loss of combat capabilities, such as salin, VX, hydrocyanic acid, benzochloric ethylketone, BZ, etc. After personnel inhales a large amount of hydrocyanic acid, he feels apprehension and dizziness within just a few seconds, becomes unconscious within half a minute, stops breathing in just one minute. When personnel is attacked by irritant agents, unbearable conditions will appear within just 1 to 2 minutes. They are more effective if used in surprise attacks on various firing points, tanks and armored personnel carriers. Slow-acting agents After being poisoned by this type of agents, their poisoning symptoms generally will not appear until after one to several hours and the enemy's combat capacities can only be affected after undergoing a specific incubation period, such as mustard gas, Louis' gas, phosgene, etc.; (14) Classification based upon sustaining time of casualty-inflicting effects; (15) Temporary agents After the application of this type of agents it generally appears in gas, mist, smoke state. It primarily contaminates the air, having a short sustaining time for casualty-inflicting effects that ranges from several minutes to dozens of minutes. Such as salin, hydrocyanic acid and BZ, benzochloric ethylketone, Adam's gas, CS, etc. used in smoke state. Sustaining agents After the application of this type of agents it generally appears in droplet or powder state. It primarily contaminate the ground, objects, water sources, and part of it can appear in gas mist state to contaminate the air. Its sustaining time for casualty-inflicting effects is long, normally ranging from several hours to several days. Such as soman, VX, mustard gas, Louis' gas, etc. The sustaining time for casualty-inflicting effects of agents is also related to the atmospheric temperature at the time and the methods of application in addition to being determined by the properties of the agent itself. For instance, the sustaining time for salin at high atmospheric temperature is short; when the atmospheric temperature is low, the sustaining time is long. Moreover, take mustard gas for example, its sustaining time is long when used in droplet state; when it is in mist state, the sustaining time is short. Similarly, irritant agents such as benzochloric ethylketone, Adam's gas, etc. are generally used as temporary agents. Yet when they are spread on the ground in large quantity to form long-term ground and air contaminations, they thus become sustaining agents.

II. Combat Performance of Agents and Their Casualty-Inflicting Characteristics

(I) Combat performance of agents of the Soviet and U.S. armed forces*

(1) 类别	(7) 名称 (19)	(18) 代号 (19) 苏军	(18) 代号 (20) 美军	(21) 杀伤作用的持续时间	(27) 毒理作用与中毒症状	(33) 战斗状态	(39) 防护要求	(43) 急救	(49) 消毒	(54) 野战特性
(2) 神经性	(8) 沙林	P—35	G B	(22) 十几分钟至几小时	(28) 破坏神经系统的正常功能，以致麻痹死亡。症状：瞳孔缩小、流口水、多汗、呼吸困难、面部青紫、全身肌肉抽搐、抽筋、昏迷。	(34) 气状 雾状 液滴状	(40) 戴防毒面具着防护服	(44) 注射阿托品进行人工呼吸	(50) 液滴染毒需消毒	(54) 液滴可呈现细雨等状
	(9) 塔崩	P—18	G A							
	(10) 梭曼	P—55	G D							
	(11) 维埃克斯		V X	(23) 夏天几小时冬天几天						
(3) 全身中毒性	(12) 氢氰酸	P—2	A C	(24) 几分钟至十几分钟	(29) 引起组织细胞急性缺氧而全身中毒，以至死亡。症状：口舌麻木、头痛、呼吸困难、皮肤鲜红、抽风、瞳孔散大。	(35) 气状 雾状	(41) 戴防毒面具	(45) 吸入亚硝酸异戊脂	(51) 不需要	(55) 无色
	(13) 氯化氰		C K							
(4) 窒息性	(14) 光气 (15)		C G	(25) 几分钟至二十几分钟	(30) 损害呼吸器官，引起肺水肿，急性缺氧而窒息。症状：流泪、咳嗽，转入潜伏期后，呼吸困难、面青紫、休克，以至死亡。	(36) 气状	(42) 同上	(46) 避免活动保持温暖	(42) 同上	(55) 无色
(5) 糜烂性	芥子气 (16)	P—74	H	(26) 几小时至几天	(31) 破坏细胞和细胞核，使肌肉溃烂。症状：皮肤红肿、起水泡、溃烂；呼吸道中毒能造成粘膜充血和水肿，甚至发生支气管肺炎。	(37) 雾状 液滴状	(40) 戴防毒面具着防护服	(47) 去掉毒液	(52) 需要	(56) 棕黄色油状液态
	路易氏气	P—43	L							
(6) 失能性	(17) 毕兹		B Z	(24) 几分钟至十几分钟	(32) 破坏胆碱能与肾上腺素能的正常功能，而使神经和躯体失能。症状：瞳孔散大、反映迟钝、行动不稳、神经失常、昏睡。	(38) 烟状	(41) 戴防毒面具	(48) 撤离毒区	(51) 不需要	(57) 白灰色粉状

Key: (1) Type; (2) Nerve type; (3) General poisoning type; (4) Asphyxiating type; (5) Vesicant type; (6) Incapacitating type; (7) Name; (8) Salin; (9) Tabon(?); (10) Soman; (11) VX; (12) Hydrocyanic acid; (13) Cyanogen chloride; (14) Phosgene; (15) Mustard gas; (16) Louis' gas; (17) BZ; (18) Code; (19) Soviet armed forces; (20) U.S. armed forces; (21) Sustaining time of casualty-inflicting effects; (22) From a dozen or so minutes to several hours; (23) From several hours in the summer to several days in the winter; (24) From several minutes to a dozen or so minutes; (25) From several minutes to a couple of dozen minutes; (26) From several hours to several days; (27) Toxicological effects and poisoning symptoms; (28) Damage the normal functions of nerve systems to inflict paralysis and cause death. Symptoms are: myosis; drooling, profuse perspiration, difficulty in breathing, face turning bluish purple, general muscle spasm, cramp and being in a coma; (29) Cause organism cells to suffer acute oxygen defficiency then turn into general poisoning and finally death. Symptoms are: Numbness of mouth and tongue, headache, difficulty in breathing, skins turning bright red, convulsions and mydriasis; (30) Damage respiratory organs to cause lungs oedema, acute oxygen defficiency and asphyxiztion. Symptoms are: tearing, coughing; after turning into the incubation period, difficulty in breathing, face turning bluish purple, shock and finally death; (31) Damage cells and cell nucleus to cause muscle fester. Symptoms are: skins bright red, blisters, fester; poisoning of the respiratory tract will cause hyperaemia and oedema in the mucous membranes, or even bronchitis; (32) Damage the functions of choline and adrenaline to cause incapacity to nerves and body. Symptoms are: mydriasis, slow reflect, unstable movement, nerve disorder and lethargy; (33) Combat state; (34) Gas state, mist state, droplet state; (35) Gas state; mist state; (36) Gas state; (37) Mist state, dropletstate; (38) Smoke state; (39) Physical protection requirements; (40) Put on gas mask and protective garments; (41) Put on gas mask; (42) Same as above; (43) Emergency treatment; (44) Inject atropine and conduct artificial respiration; (45) Inhale isopentaether nitrite; (46) Avoid movement and keep warm; (47) Remove the poisonous liquid; (48) Evacuate from the contaminated area; (49) Sterilization; (50) Sterilization is

required for droplet type contamination; (51) Not required; (52) Required; (53) Field identification characteristics; (54) Droplets may appear as drizzles; (55) Colorless; (56) Light yellow, oily type droplets; (57) Grayish white smoke type.

Continued table

(1) 类别	(7) 名称	(18) 代号 苏军	代号 美军	(21) 伤害作用的持续时间	(27) 毒理作用与中毒症状	(33) 战斗状态	(39) 防护要求	(43) 急救	(49) 消毒	(53) 野战识别特征
刺激性	(60) 苯氯乙酮		CN	(64) 呈烟状时几分钟，呈液状时十几小时至数十小时	(65) 强烈刺激眼睛和呼吸道。症状：流泪、打喷嚏，重者呕吐。	(66) 烟状	(42) 同上	(67) 用肥皂水清洗	(42) 同上	(68) 烟状
(58) 刺激性	(61) 亚当氏气	P—15	DM			粉末状				
	(62) 西埃斯		CS	几分钟至						
	(63) 西阿尔		CR	十几分钟						
(59) 备注	(69) 1.苏军X_{AB}表示毒剂弹，美军GAS表示毒剂弹。 (70) 2.有些毒剂可能混合使用，出现的症状可能与上述症状不同。									

(58) Irritant type; (59) Remarks; (60) Benzochloric ethylketone; (61) Adam's gas (62) CS; (63) CR; (64) Appear as smoke for several minutes, appear as liquid for a dozen or so hours to dozens of hours; (65) Strong irritation to the eyes and respiratory tract. Symptoms: tearing, sneezing and vomitting for severe cases; (66) Smoke state, powder state; (67) Clean with soap water; (68) Smoke state; (69) 1. X_{AB} indicates toxic agent bomb for the Soviet armed forces, GAS indicates toxic agent bomb for the U.S. armed forces; (70) 2. Certain agents may be used after being mixed, and the symptoms displayed maybe different from the aforementioned symptoms.

(II) Casualty-inflicting characteristics of agents

Large casualty-inflicting range Agents can cause contamination to a larger range of air or ground, and contaminated air can disperse with wind to a specific area. Under general conditions, the casualty-inflicting range of chemical bombs is several to a dozen or so times as great as that of anti-personnel bombs of the same caliber. Chemical attack can not only inflict casualties on unprotected personnel within a specific range in the attacked area and a specific distance in down wind direction but can also penetrate defense works that are not air tight to damage hidden effective strengths.

Numerous ways of inflicting casualty Conventional weapons primarily depend upon the bullets, shrapnels to directly inflict casualties on personnel, whereas chemical weapons cause contaminations of air, ground, objects, water sources and

food, etc. Personnel can be poisoned to cause damages by inhaling contaminated air, skins and mucous membranes (or wounds) coming in contact with the agent droplets and eating by mistake contaminated water or food.

Long sustaining time Conventional weapons can only inflict casualties at the instant of explosion, whereas the sustaining time for chemical weapons' casualty-inflicting effects lasts longer. For example, after salin toxic agent bomb explodes the sustaining time of casualty-inflicting of contaminated air can last from several minutes to several hours; after VX causes contaminations to the ground and objects, its casualty-inflicting effects can last from several days to several weeks.

III. Ways of Chemical Weapon Attack*

(I) Casualty-inflicting type chemical attacks

They are chemical attacks that inflict casualties on the enemy's effective strengths. Generally the form of rapid attack is adopted. sudden, large-quantity and concentrated attack on a certain target (area) is conducted to establish a lethal or semilethal concentration in order to reach the goal of inflicting casualties on the effective strengths. When the Soviet armed forces conduct chemical attacks on well equipped and trained effective strengths, generally they are conducted suddenly, in great quantities and concentratedly within a short period of time (such as from 15 seconds to 1 minute) with the aim of making more than 50% of the personnel in the attacked area lost their combat capabilities; when they conduct casualty- inflicting type of chemical attacks on poorly trained effective strength without protective equipment, they generally conduct sustained shelling of fast-killing type toxic agent artillery shells. Although this does not result in a high concentration of air contaminations, it does have extended effects.

(II) Delaying type chemical attacks

They are chemical attacks that delay the enemy's mobility. Generally the sustaining type agents are used to make a contaminated area in order to reach the goal of limiting the enemy's mobility. In order to delay the enemy's military movement, its reserve forces are attacked to weaken its effective strengths (such as causing 20% of personnel to lose combat capabilities), its movement roadways

are attacked to hamper its mobility, cause its vehicles, artillery and terrains of possible utilization to be contaminated and limit its utilization of materiel, equipment and terrains. For this reason, the Soviet armed forces stipulate that attacks lasting a longer time are permitted. The first attack is completed within 3 to 5 minutes. After contaminations are formed, supplementary attacks are conducted based upon meteorological, terrain conditions in order to maintain a specific contamination density and form a sustained contamination area.

(III) Disrupting type chemical attacks

They are chemical attacks that disrupt the enemy's combat movement and exhause its effective strengths. Generally a small quantity of fast-acting agents is used to conduct intermittent chemical attacks to force the enemy's to wear protective equipment for an extended length of time, thus reaching the goal of exhausting the effective strengths. The Soviet armed forces fire a small number of fast-acting toxic agent shells at the same time when they fire regular artillery shells in the attempt to create a psychological threat to the enemy, weaken its combat capabilities or make its unprotected personnel leave the defense works creating disturbance to its combat formations so that casualties can be easily inflicted by other fire powers.

IV. Influences of Meteorology, Terrains on the Application of Chemical Weapons

(I) Influences of meteorology*

1. Wind Wind direction determines the propagation direction of the agent cloud cluster. The enemy generally applies the agents when there is advantageous wind direction (downwind or crosswind); temporary type agents are used for short distance targets or under unsteady wind direction and normally its own troops are required to wear gas masks. Wind velocity affects the concentration of contaminated air, with wind velocity at 1-4 m/sec being beneficial condition for maintaining the casualty-inflicting concentration; at large wind velocity, the contaminated air disperses fast and its concentration drops rapidly, resulting in a short harmful depth. It is not easy to form a damaging concentration at a wind velocity over 6 m/sec.

2. Atmospheric temperature At a high atmospheric temperature, the liquid agent

evaporates fast forming a high contaminated air concentration that can increase the casualty-inflicting effects of the agent, but the sustaining time of droplets of agent is short; at a low atmospheric temperature, the liquid agent evaporates slowly forming a low contaminated air concentration that can weaken the casualty-inflicting effects of the agent. Certain agents may even freeze and, as a result, their casualty-inflicting effects are not brought into play.

3. Vertical atmospheric stability Vertical atmospheric stability refers to the extent of upward and downward air movements, and they can directly affect the casualty-inflicting range of chemical weapons. They generally include three kinds of conditions:

Convection --- The higher above the ground, the lower the atmospheric temperature. The air moves violently upward and downward at this time, making contaminated air disperse upward rapidly and causing the concentration to drop very quickly as well as the sustaining time for inflicting casualties to be short. Its harmful range is small and it is not beneficial for the enemy to utilize chemical weapons.

Temperature inversion --- The higher above the ground, the higher the atmospheric temperature. There is almost no upward and downward air movement at this time, making it difficult for the contaminated air to disperse upward. Rather, the air moves just above the ground which is conductive to maintaining the casualty-inflicting concentration and the sustaining time of casualty-inflicting effects. Its harmful range is large and it is an advantageous condition for the enemy to utilize chemical weapons. Temperature inversion generally occurs in sunny days (at wind velocity smaller than 4 m/sec). It is the strongest from after dusk to before dawn of the next day and it starts to break down after sunrise.

Temperature equilibrium --- It is a kind of atmospheric state between convection and temperature inversion and is a medium condition for the enemy to utilize chemical weapons. It generally occurs at dawn, dusk and in overcast days.

Therefore, under temperature inversion or temperature equilibrium conditions such as at dusk, night, dawn or in overcast days the possibility of the enemy utilizing chemical weapons is greater.

4. Precipitation (rain, snow) Large downpours or sustained light rains can disperse agents in the air, wash away agent droplets on the ground and objects and make certain agents dissolve in water to lost their toxicity. Part of the agents may drain into lowland areas or streams to form sustained danger or contaminate water sources. Heavy and medium snow can cover up the contaminated ground temporarily. When the snow layer is over 20 cm thick, it has an isolation effect on the agent.

(II) Influences of terrains

Terrains primarily affect the propagation direction and speed of agent cloud clusters. When the agent cloud clusters encounter highland during the process of propagation, the contaminated air flows over the sides or the top of the highland and makes a temporary stay at a certain area where there is little or no wind; when they encounter continuous hills, the contaminated air changes its propagation direction according to the run of the mountain and propagates along the valleys, resulting in a farther harmful depth. In open areas and on water surface the agent cloud clusters can move forward steadily and the contaminated air disperses quickly, resulting in a large effective range, short sustaining time for inflicting casualties and a light extent of harmfulness; in lowland, gulf, forest and residential areas, etc., the contaminated air is not easily propagated and dispersed, resulting in a small effective range, long retention time and a heavy extent of harmfulness.

THIRD, BIOLOGICAL WEAPONS

I. Introduction of Biological Weapons

(I) What are biological weapons*

Disease-causing microorganisms used in warfares to harm human beings, live stocks and damage crops (including bacteria, rickettsia, plasmodium(?), virus, etc.) and toxins generated by bacteria are called biological agents. Various bombs, guided missiles and gas sol generators and spreaders, etc. filled with biological agent charges are called biological weapons.

(II) Classifications of biological agents

(1) 按度伤害分程类	(3)失能性战剂 主要使人员暂时丧失战斗力。如布氏杆菌、委内瑞拉马脑炎病毒等。 致死性战剂 使人员患严重疾病，死亡率大于10%。如鼠疫杆菌、黄热病病毒等。
(2) 按染有性无分传类	(4)传染性战剂 传播速度快，一旦流行，能持续一定的时期。如鼠疫、天花等。 非传染性战剂 只感染接触者。如肉毒毒素等。主要用于战役、战术目标。

Key: (1) Classification based on extent of damage; (2) Classification based on whether they are contagious; (3) Incapacitating agents They primarily make personnel lose combat capabilities temporarily. Such as Bo's bacillus, Venezuela horse encephalitis virus, etc. Lethal agents They cause severe illness to personnel with a mortality rate greater than 10%. Such as the plague bacillus, yellow fever virus, etc.; (4) Contagious agents Their speed of propagation is fast and once they begin spreading they can sustain for a specific period of time. Such as the plague, small pox, etc. Noncontagious agents They only infect people who come in contact with them. Such as meat poison toxin, etc. They are primarily used on battle and tactical targets.

(III) Firing means of biological agents

1. Fire as biological agent gas sol

Solid or liquid biological agent particles form suspended substances in the air which are called biological agent gas sol. They can float with the wind to

contaminate the air, ground, food, water sources, etc. and permeate into defense works that do not have protection facilities. Personnel will become ill when a specific amount of biological agent gas sol is inhaled. Firing biological agent gas sol is the primary means the enemy spread biological agents. Specific methods and equipment include:

(1) Biological shells. Biological bombs and guided missile warheads generate gas sol through detonation methods.

(2) Gas sol generators. They are normally carried by aircrafts to conduct discharging and there is no sound of explosion.

(3) Spreading boxes. Spreading boxes can be carried by aircrafts to the target to be sprayed at a low altitude upwind, or they can also be discharged over ocean surface from ships to be blown toward the land.

2. Deliver germ-carrying media

Put germ-carrying insects and miscellaneous objects, etc. in specially made containers and deliver them from aircrafts, etc. Specific methods and equipment include:

(1) Four-compartment bombs. Their shape is similar to a heavy bomb with four compartments. Upon utilization, they break up at about 30 meters above the ground to spread out the insects, small animals and miscellaneous objects such as feathers, toys, etc.

(2) Hard paper cartons with parachutes. They resemble flares in appearance and are tied underneath parachutes which are suitable for spreading mosquitoes and insects with weaker vitality.

(3) Thin-shell containers. Spherical thin-shell containers have lime outer shells and are filled with insects, small animals, and they break up when they hit the ground to spread out germ-carrying insects and small animals.

3. Other means

II. Harmful Effects of Biological Weapons

(I) Avenues through which biological agents enter human body*

Inhalation Air contaminated with biological agents can enter human body through respiratory tract.

Mistakenly eat (drink) Water, food, etc. contaminated with biological agents can enter human body through digestion tract.

Skin contact Biological agents can enter human body directly through skins, mucous membranes, wounds or mosquito bites.

Due to difference in firing methods and differences in the properties of biological agents themselves, the entering avenues of various agents are not exactly identical.

(II) Disease-causing symptoms of biological agents

After biological agents enter the human body, they can destroy the physiological functions of personnel thereby causing illness. The majority of biological agents will display symptoms such as fever, headache, general weakness, vomitting and diarrhea, coughing, nausea, difficulty in breathing, local or general aches, etc. after making people sick. (The table of basic characteristics of enemy's biological agents is attached as follows.)

III. Harmful Characteristics of Biological Agents

(I) Strong disease-causing ability, wide contamination range. The disease-causing ability of germs of biological agents is very strong in that illness or death is resulted with just a small quantity of germs entering human, body and a large area of contamination is easily formed. For example, biological agents spread from an aircraft can create a contaminated area of several hundred or several thousand square kilometers in downwind direction to make personnel ill.

(II) They are infectious. Some of the Biological agents such as the plague, small pox, cholera and typhus, etc. possess strong infectious ability. If no epidemic prevention measures are taken after coming down with them, they can become epidemic diseases very quickly.

(III) Long sustaining time of harmful effects. The harmful time of biological agent gas sol is generally several hours (about 2 hours in the morning, about 8 hours at night), and this time can even be longer if the conditions are right. Cholera vibrio spread in the water can survive for dozens of days under specific conditions. Plague bacillus can survive for several weeks at shady places. Bacillus anthrax can survive for decades in soil. Some of the biological agents can survive inside the body of insects for a long time and can even pass them down to the next generations.

(IV) No immediate casualty-inflicting effects. There is a specific incubation period from the time biological agents enter human body to the time people come down with illness and its length primarily depends upon the type of agents and the dosage that enters human body. Generally it takes several hours for short ones and a dozen days or so for long ones. Contaminated personnel do not display obvious symptoms and still have combat capabilities within the incubation period.

(V) Greater influences by natural conditions. Strong sun light can cause most microorganisms to die within several hours, strong wind and convection can quickly disperse gas sol and temperature, humidity, rain, snow and terrains, etc. can all exert influences on biological agents.

Table of basic characteristics of enemy's biological agents

(1) (12) 战剂名称	传播方式 (13) 气溶胶	昆虫动物	污染食物	侵入途径 (16) 吸入 (17)	误食 (18)	接触 (19)	(21) 潜伏期(天)	(22) 传染性	(26) 所致传染病的主要症状	(37) 检疫
(2) 鼠疫杆菌	+ (14)	+ (15)		+		+	1—9	(23) 强	发热。腺鼠疫淋巴腺肿大、剧痛。肺鼠疫胸痛。(27) 血痰、呼吸困难。	(38) 对受污染人员实行观察，观察日数以该病的最长潜伏期为准。疫区封锁时间从最后一例病人隔离算起，到该病最长潜伏期满为止。虫媒传染病一方在消毒、灭虫后即可解除封锁。
(3) 霍乱弧菌		+	+		+		1—5	强	(28) 恶心、严重上吐下泻，皮肤干燥、肌肉痉挛，衰竭。	
(4) 伤寒杆菌	+	+	+		+	20	6—21	强	(29) 发热，皮肤有玫瑰疹、腹胀、便秘或腹泻。	
(5) 马鼻疽杆菌	+		+	+		粘膜	1—14	弱	(30) 皮疹，腹泻，肌肉有溃疡。	
(6) 类鼻疽杆菌	+	+	+	+		粘膜	4—7	强	(31) 发热，皮肤有脓疱，腹泻，肌肉有溃疡，头痛。	
(7) 炭疽杆菌	+	+	+	+	+	+	1—7	(23) 强	(32) 发热。吸入性炭疽呼吸困难、胸痛。皮肤炭疽有红色丘疹、水疱、硬痂。	
(8) 布氏杆菌	+		+	+	+	+	6—30	(24) 弱	(33) 波状热，大量出汗，游走性关节痛，肌肉痛，头痛，肝脾肿大。	
(9) 野兔热杆菌	+	+	+	+	+	(20) 粘膜	3—10	(25) 无	(34) 发热。腺型全身痛，淋巴腺肿大。胸型胸痛、血痰、咳嗽。	
(10) 肉毒杆菌毒素	+		+	+	+		0.5—2	无	(35) 视力模糊、复视、眼睑下垂，恶心、呕吐，全身无力。	
天花病毒	+			+		+	7—16	(23) 强	(36) 发热，颜面、外露体表先有丘疹，以后有水疱疹、脓疱疹、结痂。	

Key: (1) Name of agent; (2) Baccillus plague; (3) Cholera vibrio; (4) Typhus; (5) Horse nose bacillus anthrax; (6) Nose-type bacillus anthrax; (7) Bacillus anthrax; (8) Bo's bacillus; (9) Wild rabbit fever bacillus; (10) Meat poison bacillus toxin; (11) Small pox virus; (12) Ways of propagation; (13) Gas sol; (14) Insect, animal; (15) Contaminated food; (16) Avenues of entering; (17) Inhalation; (18) Eat by mistake; (19) Contact; (20) Mucous membrane; (21) Incubation period (day); (22) Infectious character; (23) Strong; (24) Weak; (25) None; (26) Main symptoms of infectious disease caused; (27) Fever, Enlargement of gland plague lymph node, severe pain. Chest pain in lungs plague, blood in phlegm, difficulty in breathing; (28) Nausea, severe vomitting and diarrhea, dry skin, muscle spasm, exhaustion; (29) Fever, rose-shaped rash on skin, abdominal distension, constipation or diarrhea; (30) Skin rash, diarrhea, muscle festering; (31) Fever, pustules on skin, diarrhea, muscle festering, headache; (32) Fever, Inhalation-type anthrax with difficulty in breathing, chest pain. Skin anthrax with papule, blister, scab; (33) Undulant fever, profuse perspiration, traveling type arthritis, muscleache, headache, enlargement of liver and spleen; (34) fever. Gland type general ache, enlargement of lymph node, chest type chest pain, blood in phlegm, coughing; (35) Blurry vision, double vision, eyelids prolapse, nausea, vomitting, general weakness; (36) Fever, papule in face and exposed surface of body parts, followed by blister rash, pustule rash, scab; (37) Quarantine; (38) Conduct observation of contaminated personnel with the number of days of observation based on the longest incubation period of the said disease. The time of blockade of epidemic area starts from when patients of the last example disease are isolated to the end of incubation period of the said disease. The blockade of insect-media contagious diseases can normally be lifted after conducting sterilization and insect extermination.

Continued table 1.

(39) 战剂名称	传播方式 (12)			侵入途径 (16)			(21) 潜伏期 (天)	(22) 传染性	(26) 所致传染病的主要症状	(37) 检疫
	气溶胶 (13)	昆虫动物 (14)	污染食物 (15)	吸入 (17)	误食 (18)	接触 (19)				
葡萄球菌毒素	+			+			一6小时	无	(52)上吐下泻，腹痛，头晕，全身无力。	(63) 同上
(40) 流感病毒	+			+			0.5—2	(23) 强	(53)发热，寒战，头痛，四肢酸痛，鼻塔，流涕，咽喉发干。	
(41) 黄热病病毒	+	+		+		+	2—12 (51)(有蚊)	强	(54)发热，恶寒，头痛，背和腿痛，恶心呕吐，黄胆，鼻易出血。	
(42) 登革热病毒	+	+		+		+	4—10	〃	(55)发热，有时怕冷，头痛，肌肉关节痛，全身无力，皮疹，鼻易出血。	
(43) 东马脑炎病毒	+	+		+		+	5—10	〃	(56)发热．抽搐．枕肌强直，四肢麻痹，脸腿浮肿。	
(44) 西马脑炎病毒	+	+		+		+	7—10	〃	(57)发热，恶寒，头痛，肌肉痛，四肢震颤，神志不清。	
(45) 委马脑炎病毒	+	+		+		+	2—14	〃	(58)发热，寒战，头痛，肌肉酸痛，咽喉疼痛，恶心呕吐。	
(46) 森林脑炎病毒	+	+		+		+	7—14	弱	(59)发热，面红，头痛，颈项强直，全身疲乏，恶心呕吐。	
(47) 立夫特山谷热病毒	+	+		+		+	4—6	〃	(60)发热，全身疼痛，全身疲乏，恶心呕吐。	
马丘肯雅病毒	+	+		+		+	3—12	〃	(61)发热，有时寒战，关节脊柱痛迫使患者身体呈弓形，皮疹。	
汽车拉病毒	+			+			4—19		(62)发热，呕吐，头痛，肌肉痛，易出血，严重腹泻。	

Key: (39) Staphylococcus toxin; (40) Influenza virus; (41) Yellow fever virus; (42) Dengue fever virus; (43) East horse encephalitis virus; (44) West horse encephalitis virus; (45) Venezuela horse encephalitis virus; (46) Forest encephalitis virus; (47) Lieft(?) valley fever virus; (48) Jekon(?) Kenya virus; (49) Epola(?) virus; (50) Hours; (51) (with mosquitos); (52) Vomitting and diarrhea, stomachache, dizziness, general weakness; (53) Fever, shiver, headache, soreness in all four limbs, stopped up nose, running nose, dry throat; (54) Fever, severe shiver, headache, back and leg pain, nausea and vomitting, yellow jaundice, prone to nose bleed; (55) Fever, fear of cold sometimes, headache, muscle and joint pain, general weakness, skin rash, prone to nose bleed; (56) Fever, twitch, stiffness of occipital muscle, paralysis of the limbs, swelling in face and legs; (57) Fever, severe shiver, headache, muscle pain, tremor in the limbs, be in a state of delirium; (58) Fever, shiver, headache, muscle pain, sore throat, nausea and vomitting; (59) Fever, redness in face, headache, stiffness of neck, general fatigue, nausea and vomitting; (60) Fever, general fatigue, nausea and vomitting; (61) Fever, shiver at times, joint and spine pain forcing the patient's body to shape like a bow, skin rash; (62) Fever, vomitting, headache, muscle pain, prone to bleed, severe diarrhea; (63) Same as above.

Continued table 2.

(1) 战剂名称	(12) 传播方式 (13) 气溶胶	昆虫动物	污染食物	(16) 侵入途径 (17) 吸入	(18) 误食	(19) 接触	(21) 潜伏期（天）	(22) 传染性 (23)	(26) 所致传染病的主要症状	(37) 检疫
(64) 马尔堡病毒	+ (14)		(15)	+		+	2—14	强 (73)	发热，皮疹，头痛，四肢痛，结膜炎，呕吐水泻。	(63) 同上
(65) 拉沙热病毒	+	+		+		+	3—17	(23) 强 (74)	发热，寒战，头痛，肌肉痛，咽喉疼痛，呕吐，腹泻。	
(66) Q热立克次体	+	+		+		+	3—21	(24) 弱 (75)	发热，恶寒，头痛，肌肉痛，全身无力，恶心呕吐，鼻塔。	
(67) 落矶山斑疹热立克次体	+	+		+		+	2—14	(24) 弱 (76)	发热，畏光，关节肌肉酸痛，腹股部皮疹向腿臂发展。	
(68) 斑疹伤寒立克次体	+	+		+		+	5—23 (72)	强 (77) (有鼠)	发热，寒战，头痛，肌肉酸痛，极度衰弱，皮疹，面红。	
(69) 鸟疫衣原体	+			+		·	7—14	(23) 强 (78)	发热，恶寒，头痛，全身酸痛，腹胀，失眠，不安，谵语。	
(70) 粗全孢子菌	+			+			10—21	(25) 无 (79)	发热，轻型似流感，进行型侵犯各器官，引起大量脓肿。	
(71) 组织胞浆菌	+			+	+	+	5—18	无 (80)	皮肤粘膜有肉芽肿，肺肝脾受侵害。	
1 备注	(82) “+” 表示可以使用的方式，可以侵入的途径。									

Key: (64) Malberg(?) virus; (65) Lasa(?) fever virus; (66) Q fever rickettsia; (67) Rocky mountain spotted fever rickettsia; (68) Typhus rickettsia; (69) Black plague pathogen; (70) Crude whole spore bacteria; (71) Organism cell plasma bacteria; (72) (with fleas); (73) Fever, skin rash, headache, sore limbs, conjunctivitis, vomitting and watery diarrhea; (74) Fever, shiver, headache, muscle pain, sore throat, vomitting, diarrhea; (75) Fever, severe shiver, headache, muscle pain, general weakness, nausea and vomitting, stopped up nose; (76) Fever, fear of light, joint and muscle pain, skin rash at ankles and wrists spreading toward legs and arms; (77) Fever, shiver, headache, muscle pain, extremely weak, skin rash, redness in face; (78) Fever, severe shiver, headache, ache all over, abdominal distension, insomnia, anxiety, delirious speech; (79) Fever, light quasi-flu, progressive type attacking various organs and causing large quantity of abcesses; (80) Granulation swellings at skin mucous membranes, and lungs, liver and spleen are attacked; (81) Remarks; (82) "+" indicates usable methods and avenues of entering.

FOURTH, PROTECTION AGAINST NUCLEAR, CHEMICAL AND BIOLOGICAL WEAPONS

I. Basic Principles of Protection Against Nuclear, Chemical and Biological Weapons*

(I) Actively destroy and tightly protect against. Actively destroy is to organize various effective fire powers and adopt other means to smash and destroy enemy nuclear, chemical and biological weapons so as to stop their utilization or weaken its utilization capabilities. Tightly protect against is to employ tight protection organizations, full protection preparation and effective protection actions to ensure troops' freedom of movement and sustained combat capabilities under the conditions of having nuclear, chemical and biological weapons utilized.

(II) Take protection with the mass character as the dominant factor, enhance the ensurance of professional soldiers. Protection with the mass character is to bring the initiative and activeness of all the officers and men into full play and earnestly organize based upon the characteristics of our own troops. The main content is to build and strengthen protection organizations, enhance protection trainings and adopt various simple and easy protection measures that are suitable for local conditions. Ensurance of professional soldiers is to bring the effects of antichemical troops and other professional personnel into full play, give timely guidance on the protection of troops and the masses, take up the responsibility of professionally protecting certain crucial targets and complete certain protection duties with higher degree of technical characters.

(III) Be good at utilizing technical equipment and extensively develop simple and easy protection. The various antichemical equipment of our armed forces are the basic backing of protection implemented by troops. But in view of the conditions of protracted battles, independent battles and difficulties in supplying equipment in wartime, it is still necessary to develop protection by mobilizing and relying upon the masses to utilize simple and easy protection equipment.

II. Primary Measures of Protection Against Nuclear, Chemical and Biological Weapons*

(I) Employ various reconnaissance means to timely investigate the deployment, attempt of utilization and readiness conditions of enemy nuclear, chemical and

biological weapons. The primary targets for investigation are: their deployment areas, launching positions, command and control facilities and locations of ammunition depots; their attempts and means of utilization, possible targets and areas of attack; the setup and features of enemy nuclear and chemical barriers, especially the signs before the enemy's utilization, etc.

(II) Organize effective fire powers or adopt other active means to smash and destroy the enemy nuclear, chemical and biological weapons. In battles, once it is discovered that the enemy is using this kind of weapons, effective fire powers should be organized to do all we can to destroy them before they are being used or while being shipped; if they have already been used, then the enemy should still be forced to stop using them or weaken its capability of continued utilization. When organizing fire powers to destroy them, the priority must be to destroy those targets that present the biggest threat to troops first.

(III) Establish tight observation and warning networks to timely discover the signs and conditions of sneak attacks by enemy nuclear, chemical and biological weapons and utilize various communications means to timely, accurately sound off, with priority, warning signals of attacks by enemy's nuclear, chemical and biological weapons. In order to organize reliable protection, regular observation posts at each level, in addition to special nuclear and chemical observation posts established by armies and divisions, should all simultaneously take up the duties of discovering signs of an attack and observing the conditions of an attack. Once attack signs are discovered and enemy attack is underway, the observation posts should report the situations to superiors immediately such that the headquarters can utilize warning networks and various communication means to timely, accurately announce, with priority, informing signals about attacks of nuclear, chemical and biological weapons.

(IV) Fully utilize the advantageous conditions of terrains and meteorology, and camouflage strictly, deploy sparsely and move covertly. Camouflage strictly is another important aspect for the troops to reach the goal of moving covertly and maintaining military strength. In order to avoid or reduce losses inflicted by enemy nuclear and chemical weapons, the troops must, regardless of whether conducting an attack or a defense, in the front line or rear area, employ various camouflage measures such as carrying out electronic interference against the enemy; establishing phony targets, releasing phony intelligence, carrying out fake

attacks to trick the enemy; and strictly stipulate security measures, block the passage of information, etc. to conceal the attempt of troops movement. Make every effort to sparsely deploy armed forces and weapons and conceal movement.

(V) Construct various defense works for protection. The main defense works should include facilities for protecting against attacks by nuclear, chemical and biological weapons. In order to bring the protection effects of defense works into full play and ensure the reliability of defense works, every effort should be made to include the three-defense facilities in the main defense works and perfect them progressively. Designated personnel should be assigned to be responsible for the maintenance, utilization of the three-defense facilities and the protection ensurance inside the defense works. During battles, every respite must be grasped to conduct timely repairs of damaged defense works and the three-defense facilities in order to maintain the protection stability of the defense works.

(VI) Organize the supply of antichemical equipment and its technical ensurance, fully utilize standard equipment and substitute-for-convenience equipment to conduct protection. The supply of protection equipment should follow the principle of main direction first and secondary direction next, front edge first and depth next, urgent ones first and nonurgent ones next, and key points ensurance. The method of forward shipping or fixed-point supplying is employed to organize and implement. Each level should maintain a specific percentage of reserve quantity. In order to make up for the shortage of standard equipment and supply difficulties in wartime, substitute equipment should be gathered extensively and captured equipment should be utilized as much as possible. For standard equipment, the systems of inspection, maintenance and repair, etc. should be perfected to raise its rate of utilization.

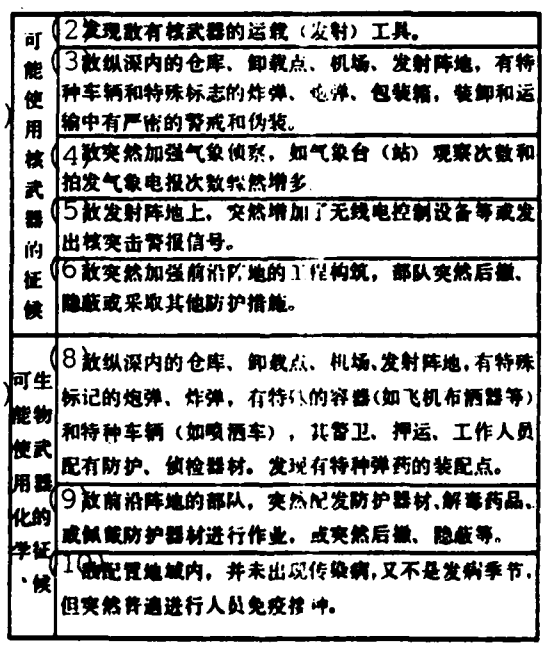
(VII) Organize medical prevention, epidemic prevention and disinfection with the mass character. Under the conditions of attack by enemy nuclear, chemical and biological weapons, timely organize medical prevention, epidemic prevention and disinfection is one of the important tasks of the headquarters and logistics department. Its primary contents are: conduct preventive inoculation or prescribe preventive medicines for troops personnel within the combat zone; inspect the sanitation and epidemic prevention conditions within the troops deployment area and initialize the masses health and epidemic prevention task; eliminate microorganisms which cause diseases and the breeding conditions of various contagion

sources; establish epidemic prevention stations, epidemic prevention teams to specifically guide the epidemic prevention task.

(VIII) When troops are moving within contaminated areas, timely protective measures should be taken and safety regulations must be followed. Troops deployed within contaminated areas should be rotated to rest, relief of duty or evacuation from contaminated areas according to instructions from the superiors. Combat situations and terrain conditions should be considered when crossing contaminated areas to either overcome or make a detour.

(IX) After receiving attacks by enemy nuclear, chemical and biological weapons, situations should be quickly and clearly investigated and combat deployment adjusted to continue the execution of combat duties; timely rescue, put out fire and repair defense works; carry out radiation, chemical and biological reconnaissance and control the dosage received, inspect contaminations; organize to neutralize and eliminate contamination based on duties and contamination situations; conduct inspection and sanitary process on possibly contaminated food and water.

III. Signs of Enemy Preparation to Use Nuclear, Chemical and Biological Weapons



Key: (1) Signs of possible utilization of nuclear weapons; (2) Discovering of enemy shipping (launching) tools of nuclear weapons; (3) Presence of special vehicles and specially marked bombs, artillery shells, boxes

in warehouses, unloading points, airports, launching positions within the enemy's depth zones along with tight security and camouflages during their unloading and transportation; (4) The enemy suddenly increases its meteorological reconnaissance, such as sudden increase in number of observations by meteorological observatories (stations) and number of dispatches of meteorological telegrams; (5) Sudden increase in radio control facilities, etc. or issuance of warning signals about surprise nuclear attacks at enemy launching positions; (6) Sudden strengthening of enemy engineering construction at its frontal positions, sudden retreat, concealment or adoption of other protection measures by the enemy; (7) Signs of possible utilization of chemical and biological weapons; (8) Presence of specially marked artillery shells, bombs in the warehouses, unloading points, airports and launching positions inside the enemy depth, presence of special containers, (such as aircraft spreaders, etc.) and special vehicles (such as spraying cars), and their guards are equipped with protective and detection equipment. Assembly points of special ammunitions are found; (9) Troops in the enemy front edges are suddenly being equipped with protective equipment, antidotes, or start conducting operation wearing protective equipment, or are suddenly being pulled back, concealed, etc.; (10) Within the enemy deployment area, general immunization inoculations are suddenly being conducted on all personnel while there are no outbreaks of epidemic diseases, nor is it the epidemic season.

IV. How to Organize in Order to Destroy and Sabotage Enemy Nuclear, Chemical and Biological Weapons

(1 目标	(2)敌核、化学、生物武器的发射阵地，发射工具和运载工具，指挥控制设施以及储备仓库和基地等。首先集中摧毁和破坏对我威胁最大的目标，特别是核武器。
时3机	(4)力争在敌人使用前消将其破坏和消灭。也要积极摧毁破坏敌人正在使用和运行中的核武器、化学武器、生物武器
5方法	(6)摧毁和破坏的方法，应根据目标的距离及我军的摧毁破坏能力确定。分别以地面炮兵、高射炮兵、航空兵、火箭、导弹等实施摧毁。如1969年越南人民武装在西原地区击落美军布毒飞机19架。即使打不中，也迫使敌机升高而降低布毒效果。还可以派侦察分队、空降兵、游击队、民兵、地方武装，深入敌后进行破袭。如在1968年春越南人民武装炸毁了敌人在隆平、芽庄、归仁、岘港等地的毒剂仓库和较多的能布毒的大型运输机。同年九月又袭击了岘港市内郑明世桥毒剂仓库，使敌人暂时未能用毒。军，炮兵通常用于摧毁敌浅纵深的目标对敌远纵深的火箭发射工具、仓库等可由深入敌后的侦察分队，游击队进行破袭，或请求航空兵予以摧毁

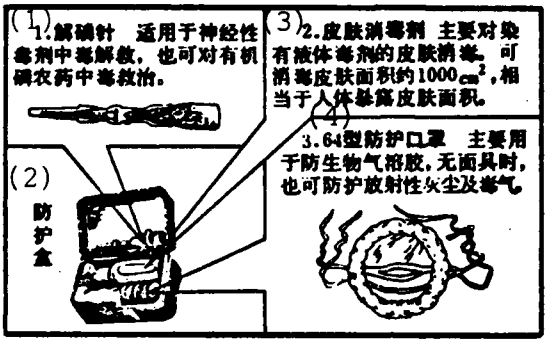
Key: (1) Target; (2) Launching positions, launching tools and shipping tools, command control facilities as well as reserve warehouses and bases of enemy nuclear, chemical and biological weapons. Concentrate first to destroy and sabotage those targets that pose the most threats to us, especially nuclear weapons; (3) Opportunity; (4) Do all we can to destroy and smash them before they are being used; moreover, take the initiative to destroy and sabotage those nuclear, chemical and biological weapons that the enemy is currently using or are being transported; (5) Method; (6) The method of destroying and damaging should be determined based on the distance of target and the destroying and damaging capabilities of our armed forces. Separately carry out destruction using ground artillery, antiaircraft guns, airmen, rockets, guided missiles, etc. Such as in 1969, the Vietnamese people's armed forces shot down 19 U.S. toxic agent spreader aircrafts in the West Plain area. Even if they had not been hit, this could have forced enemy aircrafts to fly higher, thereby lowering the effectiveness spreading of toxic agents. Also, reconnaissance squads, paratroopers, guerrilla, militia, local armed forces may be dispatched to penetrate deep into the enemy's rear areas to conduct sabotage. Such as in the spring of 1968, the Vietnamese people's armed forces blew up t... enemy's toxic agent warehouses and more large cargo planes capable of spreading toxic agents in cities such as Longping, Yazhuang, Guiren, Xiangang, etc. In September of the same year, the Zhengming Bridge toxic agent warehouse inside Xiangang was attacked and caused the enemy to temporarily stop the utilization of toxic agents. The army and divisional artillery is generally used to destroy enemy targets with a shallow depth; whereas for enemy warehouses, rocket launching tools, etc. of far depth, the scout squads and guerrilla penetrating deep behind the enemy's lines may be used to inflict destruction and sabotage, or request the assistance of air force to inflict destruction.

V. Primary Performance of Gas Masks*

型 (1) 号		64型 (2)	65型 (2)	69型 (2)
用 (3) 途		(4) 保护呼吸器官、眼睛及面部免受毒剂、放射性微粒及生物战剂的伤害。		
(5) 编配范围		(6) 防化部、分队	(7) 合成军	
(8) 重量(公斤)		1.4	0.59	0.8
防护时间	防氯化氰	(10) 43分钟	(13) 30分钟	(13) 25分钟
	防沙林	(11) 10小时	(14) 10小时	(15) 小时以上
	防维埃克斯	(12) 2小时	(14) 30分钟	(13) 30分钟

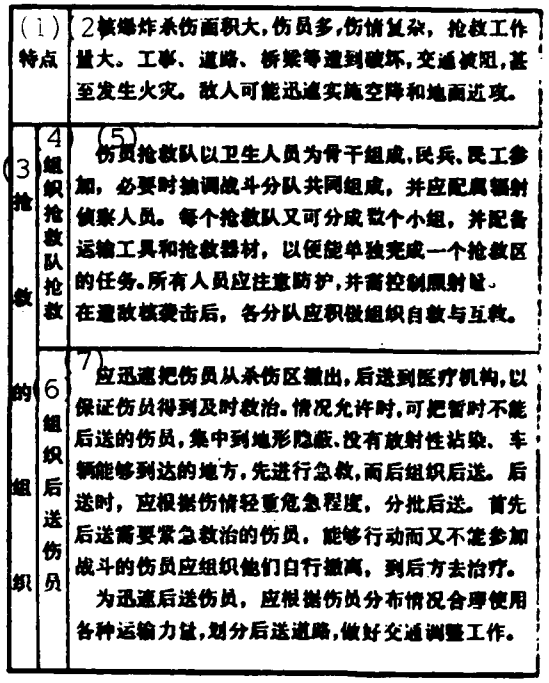
Key: (1) Model Number; (2) Model; (3) Uses; (4) Protect respiratory organs, eyes and face against injuries inflicted by toxic agents, radioactive particles and biological agents; (5) Scope of deployment; (6) Antichemical department, squads; (7) Combined army; (8) Weight (kilogram); (9) Effective protection time; (10) Against cyanogen chloride; (11) Against salin; (12) Against VX; (13) Minutes; (14) Hours; (15) Over 6 hours.

VI. Performance of Protective Boxes*



Key: (1) 1. Dephosphorus needle Suitable for the detoxification of nerve agent poisoning, it can also be used for treating poisoning of organic phosphorus pesticides; (2) Protection box; (3) 2. Skin disinfectant Mainly for the disinfection of skins contaminated with liquid toxic agents. Can be used for disinfecting skin surface of an area about 1000 cm^2, equivalent to the area of exposed human body skin surface; (4) 3. 64-model protective gauze mask Mainly used for protection against biological gas sol; it can also be used for protection against radiative dust and gas without the mask.

VII. Rescue Organizations for Injured Personnel in Nuclear Explosion Casualty-Inflicting Area



Key: (1) Characteristics; (2) The casualty-inflicting area of nuclear explosion is large with numerous injured personnel, complex injury conditions and a tremendous rescue task. Defense works, road, bridges, etc. are damaged causing breakdown in transportation, even fire disasters. The enemy may carry out swift airborne and ground attacks; (3) Organization of rescue; (4) Organize rescue teams to carry out rescuing; (5) Injured personnel rescue teams are composed of health professionals as the backbone, with militia and civilian labors also participating. If necessary, combat squads are transferred to jointly make up the team and radiation detection personnel should also be attached. Each rescue team can be divided into several units which are equipped with transportation tools and rescuing equipment in order to be able to independently complete the rescue mission with a rescue area. All personnel should take note of protection and must control irradiation dosages. After being attacked by the enemy, each team should actively organize self-help and mutual help; (6) Organize shipping injured personnel to the rear; (7) Injured personnel should be evacuated from casualty-inflicting areas immediately and be sent to medical facilities in the rear to ensure timely treatment

for the injured personnel. Wherever conditions permit, injured personnel who temporarily can not be sent to the rear may be gathered at concealed places where there is no radioactive contamination and are accessible to vehicles to conduct emergency treatment then organize them to be sent to the rear. When sending them to the rear, priority should be set based on their degrees of injury and urgency in order to separate them into groups for sending to the rear. Send injured personnel who require emergency treatment to the rear first. Injured personnel who are not disabled but are unable to participate in combat should be organized so that they can evacuate themselves to the rear for treatment. In order to quickly send injured personnel to the rear, various transportation forces should be reasonably utilized based on the distribution conditions of injured personnel, roads for sending to the rear should be planned in order to conduct the transportation tasks well.

VIII. Primary performance and Applications of Several Disinfectants

(1) 名称	(11) 色、嗅、态	(18) 有效氯	(19) 溶解性能 (20) 在水中	(24) 在有机溶剂中	(27) 可消的毒剂	(33) 使用状态	(42) 适宜消毒的对象 (43)
(2) 三合二	(12) 白色粉末有氯气味	56—65%	(21) 能溶	(25) 不溶	(28) 腐烂性毒剂 含磷毒剂 (29)	(34) 悬浊液 1：7—1：9 (35) 澄清液 (44)	地面、工事、码头、橡胶制品 被服、技术装备、皮肤
(3) 次氯酸钙	(13) 同上	80—85%	(22) 易溶	(25) 不溶	腐烂性毒剂 神经性毒剂	(36) 水溶液 (45) (1：10)	武器装备、地面、橡胶、木材、码头
(4) 漂白粉	(13) 同上	28—32%	(21) 能溶	(25) 不溶 (28)	腐烂性毒剂 含磷毒剂	(34) (35) 悬浊液、澄清液 (1：4—1：5)	地面、工事、武器、技术装备 (46)
氢氧化钠 (5) (烧碱)	(14) 白色固体		(22) 易溶	(26) 能溶(不 (30) 溶	含磷毒剂 路易氏气	(37) 5—10%的水溶液	地面、玻璃容器、橡胶材料 (47)
(6) 氨水 (7)	(15) 无色液体 (16)		(23) 任意溶解	(13) 同上 (25)	(31) 含磷毒剂 (31)	(38) 10%的氨水 (39) 20%的氨水(冬季)	武器装备、皮肤、地面、工事 (48) (49) 武器、装备、地面、工事
碳酸氢钠（小苏打）	白色粉末(固体)		(21) 能溶	不溶	含磷毒剂	(37) 5%的水溶液	眼、耳、喉、鼻等 (50)
碳酸钠（苏(8)打）	(13) 同上		(22) 易溶	(25) 不溶	(13) 同上	(13) 同上	服装（浸泡或煮沸） (51)
消 (9) 毒粉	(13) 同上				(32) 各类毒剂	40 粉末 (52)	皮肤、服装、武器装备
(10) "191" 消毒剂 (醇—胺—碱消毒剂)	(17) 液体				(32) 各类毒剂	41 溶液 (53)	装备、装备

Key: (1) Name; (2) Three-in-two; (3) Hypocalcium chlorate; (4) Bleaching powder; (5) Sodium hydroxide (caustic soda); (6) Ammonia water; (7) Sodium bicarbonate (small soda); (8) Sodium carbonate (soda); (9) Disinfection powder; (10) "191" disinfectant (alcohol-amino-alkali disinfectant); (11) Color, smell, state; (12) White powder with chlorine gas odor; (13) Same as above; (14) White solid; (15) Colorless liquid; (16) White powder (solid); (17) Liquid; (18) Effective chlorine;

(19) Dissolvability; (20) In water; (21) Dissolvable; (22) Easily dissolvable; (23) Arbitrarily dissolvable; (24) In organic solvent; (25) Not dissolvable; (26) Dissolvable in alcohol; (27) Detoxifiable agents; (28) Vesicant agent, phosphorus-containing agent; (29) Vesicant agent, nerve agent; (30) Phosphorus agent, Louis' gas; (31) Phosphorus-containing agent; (32) Various toxic agents; (33) Utilization state; (34) Muddy liquid; (35) Clear liquid; (36) Muddy liquid, clear liquid; (37) 5-10% water solution; (38) 10% ammonia water; (39) 20% ammonia water (winter); (40) Powder; (41) Solution; (42) Appropriate targets for disinfection; (43) Ground, defense works, docks, rubber products; (44) Weapons, technical equipment, skin; (45) Weapon equipment, ground, rubber, lumber, docks; (46) Ground, defense works, weapons, technical equipment; (47) Ground, glass containers, rubber material; (48) Weapon equipment, skin, ground, defense works; (49) Weapons, equipment, ground, defense works; (50) Eyes, ears, throat, nose, etc.; (51) Clothes (soak or boil); (52) Skin, clothes, weapon equipment; (53) Weapons, equipment.

IX. "Three-Defense" Requirements of Field Defense Works

(1) 工事种类	(2) "三防"要求
堑壕、交通壕、掩体	(4) (一) 堑壕、交通壕应根据地形构筑成曲线或折线形，可能时适当加深，土质松软地段的壁壁应进行支护。 (二) 掩孔不被复时，应构筑成拱形，自然防护层厚度最好不小于0.7米，一般以拐两个弯为宜。洞口应选择不同的方向。有条件时，应加设护板，构筑掩孔的一段堑壕、交通壕最好加以掩盖。 (三) 对外露的易燃材料应采取涂泥浆等防火措施，以提高防光辐射和防火的能力。
(5) 机枪观察工事	(6) (一) 在满足战术技术要求的条件下，工事应尽量缩小、低下，以增加防护土层的厚度。工事周围和顶部的积土要夯实，最好用草皮复盖。 (二) 为了增强孔口的防护能力，在不影响射击、观察的前提下，力求缩小射孔和观察孔的尺寸，并应设置防护盾板或防护密闭盾板。出入口应设置防护门，与出入口连接的交通壕最好加以掩盖。 (三) 土木工事应加强防光辐射措施。
(7) 掩蔽部所 掩蔽所洞	(8) (一) 掩蔽部和避弹所的出入口是工事的薄弱部位，为防止塌壁坍塌造成出入口堵塞，连接出入口的交通壕最好加以掩盖，重要的工事应设置两个不同朝向的出入口。为防止防护门破碎造成工事内人员的间接损伤，掩蔽部和避弹所的通道与主体最好成直角配置。 (二) 构筑掩蔽所和短洞时，应充分利用地形，尽量使工事低下。条件允许时，最好设置与主体结构相等强度的防护门。短洞的自然防护层厚度一般应在3米以上，在风化岩石上构筑短洞时，应采取加固措施。 (三) 为有效地防止早期核辐射对工事内人员的伤害，避弹所和掩蔽部及掩蔽所的防护层厚度一般不小于1米。结构周围的回填土和复盖层，应注意夯实。 (四) 加强密闭通风设施。

Key: (1) Types of defense works; (2) "Three-defense" requirements; (3) Trench, communication trench, cliff cave, bunker; (4) (I) Trench, communication trench should be constructed into curved or broken line shape based on the terrain. If possible, deepen them appropriately; cliff walls in sections of loose soil should be reinforced. (II) It would be best if unreinforced cliff caves could be constructed into arch shape with the thickness of natural defense layer being no less than 0.7 meter and generally it would be appropriate to have two turns. Different directions should be selected for cave entrance. When feasible, a protection shield should be added and it would be best if the section of trench and communication trench leading to the caves could be covered. (III) Fire protection measures such as smearing with mud, etc. should be adopted for flammable materials in order to increase the capability of light radiation protection and fire protection; (5) Machine gun defense works, observation defense works; (6) (I) Under

The condition of satisfying the technical requirements for tactical reasons, defense works should be as low and small as possible in order to increase the thickness of the protective dirt layer. The dirt pileup around and on top of the defense works must be firmly packed and it would best to cover it with grass. (II) In order to increase the protection capability of cave entrance and under the premise of not affecting firing and observation, the dimensions of firing holes and observation holes are reduced as much as possible and protection shield or tightly sealed protection shield should be installed. A protection door should be installed at the entrance and it would be best if the communication trenches connected to the entrance are covered. (III) Light radiation protection measures should be enhanced for defense works construction; (7) Shelter, bomb shelter station, shelter station, short cave; (8) (I) The entrances of shelter and bomb shelter station are the weakest portion. In order to prevent the entrances from being blocked by collapsed cliff walls, the communication trenches connecting the entrances are better covered, and two entrances facing different directions should be built for important defense works. In order to prevent indirect injuries to personnel inside the defense works by shattered protection door, the passways and main body of shelters and bomb shelter stations are better disposed at right angles; (9) (II) When building shelters and short caves, the terrains should be fully utilized and the defense works should be made as low as possible. Whenever conditions permit, a protection door with the same strength as the main body structure should be installed. The thickness of natural protective layer of the short cave should generally be over 3 meters. When constructing short caves on weathered rocks, reinforcing measures should be taken. (III) In order to effectively prevent damages inflicted by early-stage radiation to personnel inside the defense works, the thicknesses of protective layer of the bomb shelter stations, shelters and shelter stations are generally not smaller than 1 meter. The filling dirt and cover layer around the structure should be firmly packed. (IV) Enhance sealing and ventilating facilities.

X. Utilization of Integral Protection Defense Works

(1) 使用时机	(2) 隔绝防护	(3) ①没有滤毒通风装置遭核、化、生武器袭击。 ②有滤毒通风装置，但毒剂浓度过高，暂时性毒剂或未弄清毒剂的性质。 ③滤毒通风系统遭破坏，进风口附近有火或被堵。
	(4) 过滤防护	(5) ①当高浓度毒云过去以后。 ②当受染空气进入工事。 ③工事的密闭设施损坏。
(6) 使用规则	(7) 袭击前	(8) ①只关防护门，不关密闭门(门帘)。 ②敌人飞机(空)袭时，关上第一道密闭门(门帘)。 ③当接到核、化学、生物武器袭击的警报时，应关闭所有密闭门(门帘)。
	(9) 袭击时后	(10) ①隔绝防护时，一般禁止人员出入。控制灯火，禁止吸烟，减少体力活动，注意卫生。 ②过滤防护时，每小时3至4人成组出入不超过两次。 ③出入工事时，只能同时打开一道密闭门(门帘)。 ④未经批准的人员、物品，不准进入工事的内室。
(11) 注意事项		(12) ①工事长期不使用或经过一段时间使用后，应进行密闭性能检查。常用方法有，灯光法、火焰法以及皂泡法等。 ②平时应经常通风，保持干燥、清洁。

Key: (1) Opportunity for utilization; (2) Isolated protection; (3) ① Not equipped with toxic agent filtering ventilation device when attacked by nuclear, chemical and biological weapons; ② equipped with toxic agent filtering ventilation device, but the concentration of toxic agent is higher; temporary toxic agent or the properties of toxic agent are not clear; (4) Filtered protection; (5) ① When the high-concentration cloud passes; ② When contaminated air enters defense works; 3 Hermetic facilities of defense works are damaged; (6) Rules for utilization; (7) Before attack; (8) ① Only close the protection door, not the sealing door (drapery); ② When under enemy artillery (air raid) attack, close the first hermetic door (drapery). When warnings of nuclear, chemical and biological attacks are received, all hermetic doors (draperies) should be closed; (9) During (after) attack; (10) ① When conducting isolated protection, generally no personnel is allowed in or out. Lights are controlled, smoking is not allowed, reduce physical activities and take note of sanitation; ② When conducting filtered protection, groups of 3 to 4 persons entering or leaving does not exceed two times each hour; ③ When entering or leaving the defense works, only one hermetic door (drapery) is opened at one time; ④ Personnel, objects not rinsed or sterilized are not allowed to enter inner rooms of defense works; (11) Items to be taken note of; (12) ① Airtightness inspection should be conducted for defense works not being used for a long time or being used for a period of time. Methods often used are; lighting method, flame method and soap bubble method, etc.; ② Ventilation should be provided during ordinary time, keep dry and clean.

XI. Protection Required When Passing Through and Staying within Contaminated Areas

(1)区分		(7)防护措施	(13)要求
(2)徒步、乘汽车（装甲车、坦克）		(8)戴防毒面具或口罩，扎紧"三口"，戴手套，穿高腰胶鞋或解放鞋（空气中无扬尘时可不戴面具）	(14)快速前进，避免扬尘，拉大车距，尽量不触摸受染物体，步行尽量绕过高照射率地段。
(17)在坦克或装甲车内		(9)戴防毒面具或口罩。	(15)关闭各种窗、孔和风扇。
(3)高照射率地区	(4)照射率100伦/时以上	(10)利用工事防护，人员先进入工事防护，待照射率降到一定程度后，再外出活动。	(16)力求减少扬尘，不随意解除防护，对人员常活动处消除沾染。在沾染区不进食、不喝水，非常必要时，可在5伦时以下地面野炊和就餐，保持粮、菜、水洁净）；定时测定人员所受照射剂量。
	(5)地面照射率50—100伦/时	(11)轮换休息。视战斗情况，阵地上留下值班人员搞好个人防护，其余进入工事轮休。 转移。情况允许时，将暴露人员转移到本分队配置地域的低照射率地区。 换班。由上级统一组织。	
(6)低照射率地区		(12)简易防护，戴面具或口罩，扎"三口"，戴手套，穿胶鞋。	

Key: (1) Classification; (2) On foot, by car (armored vehicle, tank), Inside tank or armored vehicle; (3) Areas of high rate of irradiation; (4) When rate of irradiation is above 100 roentgens; (5) When ground rate of irradiation is 50 - 100 roentgens; (6) Areas of low rate of irradiation; (7) Protective measures; (8) Wear

gas mask or gauze mask, tightly tie the "three openings" up, wear gloves, wear waist-high rubber shoes or liberation shoes (gas mask should not be worn when there is no dust in the air); (9) Wear gas mask or gauze mask; (10) Protection utilizing defense works. Personnel enter defense works first and only emerge to move about arter the rate of irradiation has dropped to a specific degree; (11) Take turns to rest. Based on combat situations, personnel on duty stay in the position while carrying out good personal protection, the rest enters defense works to take turns to rest. Relocate. When situations permit, relocate exposed personnel to the assigned area of low rate of irradiation. Change shift. It is centrally organized by the superiors; (12) Equipment protection. Wear gas mask or gauze mask, tightly tie the "three openings" up, wear gloves and wear rubber shoes; (13) Requirements; (14) Advance swiftly, avoid kicked-up dust, keep a large distance between vehicles, do one's best not to touch contaminated objects; do one's best to detour areas with high rate of irradiation; (15) Close various windows, openings and fans; (16) Do all one can to reduce kicked-up dust, protection is not lifted at will; decontaminate places where personnel frequent; do not eat food and drink water in contaminated area (when it is extremely necessary, cooking and eating on ground with less than 5 roentgens are allowed, keep provisions, dishes and water clean); test the dosage of irradiation received by personnel at specific times; (17) Inside tank or armored vehicle.

XII. Protective Measures Required When Passing Through Contaminated Areas

(1) 分区		(9) 防护措施	(14) 要求
(2) 暂时性毒剂的地区		(10) 戴面具。	(15) 选择无植物层高地通过，尽量在毒区上风处通过；力避洼地、弹坑、丛林(高草)地和有明显液滴地段；通过高草地时，尽量用一路纵队行进；经常检查和及时处理人员的染毒情况。
(3) 持久性毒剂地区	(4) 徒步 (5) 高草地	(11) 戴面具、手套，穿靴套或用塑料布、稻草包裹腿脚。	
	(6) 平坦地低草地	(12) 戴面具、手套，穿胶鞋、扎裤脚。	
	(7) 乘车	(13) 戴面具。	
	(8) 沿消毒通路		

Key: (1) Classification; (2) Areas with temporary-type toxic agents; (3) Areas with sustaining-type toxic agents; (4) On foot; (5) High grassland; (6) Flat land, low grassland; (7) By vehicle; (8) Along roadways of sterilization; (9) Protective measures; (10) Wear gas mask; (11) Wear gas mask and gloves, wear overboot or wrap feet and legs with plastic cloth and straw; (12) Wear gas mask and gloves, wear rubber shoes and tie up the bottom of trousers; (13) Wear gas mask; (14) Requirements; (15) Select highlands without vegetation layers to pass through; pass through the upwind area of contaminated area as much as possible, do all one can to avoid lowlands, bomb crators, forest (high grass) land and sections with obvious liquid droplets; when passing through highlands. Proceed in single file as much as possible; frequently inspect and timely act on the contamination situations of personnel.

XIII. Protective Measures Required When Passing Through Biologically Contaminated Areas

(1)分类	(4)防护措施	(7)要求
(2)生物战剂气溶胶	(5)戴面具或口罩，也可用毛巾、三角巾掩口鼻。	(8)尽量在污染区上风处通过；增大距离，避免扬尘；晴朗的白天尽量在低洼地通过，阴天、早、晚尽量选择在高地通过。
(3)带菌媒介物	(6)戴防虫帽，穿防护服或扎"三口"，穿胶鞋防昆虫叮咬。暴露皮肤可涂擦驱避剂。每次用药3—5毫升，切勿入眼及全身涂擦，以免过量引起中毒。	

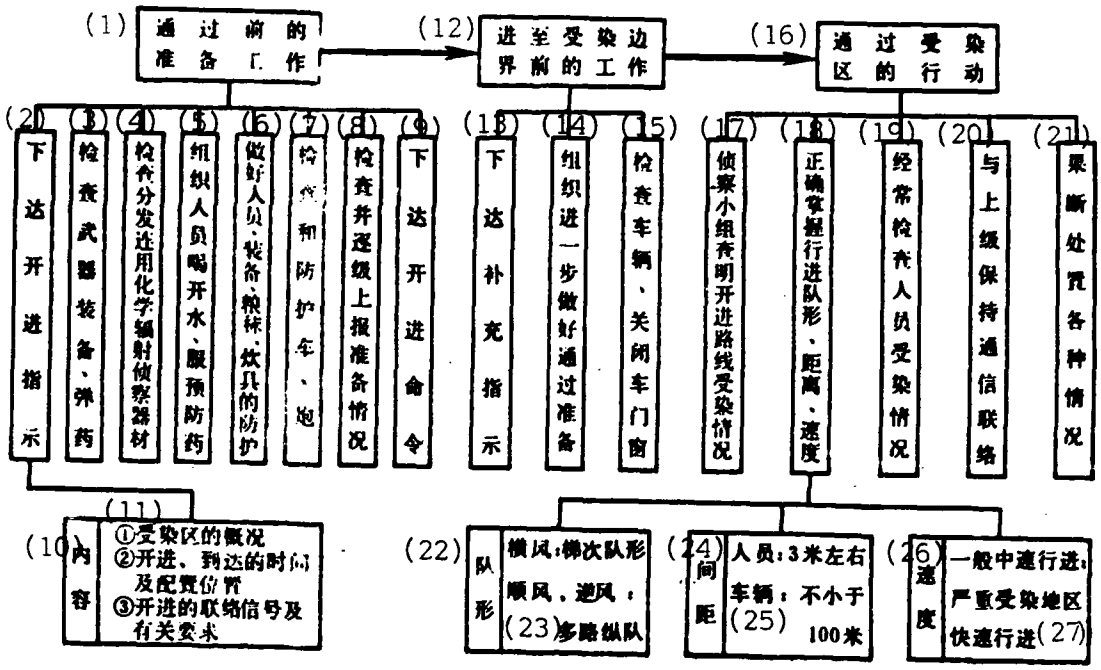
Key: (1) Classification; (2) Gas sol of biological agents; (3) Bacteria carrying media; (4) Protective measures; (5) Wear gas mask or gauze mask; towels, triangular scarves may also be used to cover mouth and nose; (6) Wear anti-insect hats, wear protective clothes or tightly tie up the "three openings", wear rubber shoes to protect against insect bites. Insect repellent may be rubbed on exposed skin. A dosage of 3 - 5ml is used each time and it must not be allowed to enter the eyes or be used on the entire body in order to prevent from being poisoned by overdoses; (7) Requirements; (8) Pass through places upwind of contaminated areas as much as possible; increase separating distances, avoid kicking up dust; pass through lowlands during day time of sunny days as much as possible; yet in overcast days, select highlands to pass through in the morning and at night as much as possible.

XIV. Protective Measures Required When Staying Inside Contaminated Areas

(1) 措施	(6) 方法	(11) 注意事项
(2) 利用工事防护	(7) 人员进入有防毒设施的野战工事进行防护。在工事内的人员要保持安静，避免不必要的活动，禁止吸烟和生火，以减少氧气的消耗。	(12) 1.应组织分队轮流完成繁重任务，若情况允许，应安排在日气温低的时间里。 2.根据防护器材的防毒效能和毒剂的浓、密度，适时更换防护器材。 3.有可能时，应提供一块消毒区，保证部队睡眠、饮食和排除大小便之用。
(3) 利用器材防护	(8) 戴防毒面具，穿靴套，或穿胶鞋，也可用塑料布、麻袋片裹腿脚。	
(4) 利用有利地形防护	(9) 尽可能将部队配置在高地、染毒轻的地域和毒区的上风方向。	
(5) 轮换休息	(10) 组织分队轮流到有防化设施的掩蔽部、未染毒的小块地域或经过消毒处理的地域休息。	

Key: (1) Measures; (2) Utilize defense works for protection; (3) Utilize equipment for protection; (4) Utilize favorable terrain for protection; (5) Take turns to rest; (6) Methods; (7) Personnel enters field defense works equipped with antitoxic agent facilities for protection; (7) Personnel inside defense works must keep quiet, avoid unnecessary activities; smoking and starting fires are prohibited in order to reduce oxygen depletion; (8) Wear gas masks, wear overboots or rubber boots; plastic sheets, pieces of gunnysack may be used to wrap up legs and feet; (9) Deploy troops at highlands, light contamination regions and upwind direction of contaminated areas as much as possible; (10) Organize squads to take turns to rest at shelters equipped with antichemical facilities, small uncontaminated regions or sterilized regions; (11) Items to take note of; (12) 1. Squads should be organized to take turns to accomplish tough missions; if situations permit, they should be arranged such that they are during times of low daytime atmospheric temperature. 2. Protective equipment are timely replaced based on antitoxic effectiveness of protective equipment and concentration and density of toxic agents. 3. When possible, a sterilized region should be provided to ensure that troops have a place to sleep, eat and go to bathroom.

XV. Organization of Infantry Platoons When Passing Through Contaminated Areas and the Methods of Implementation



Key: (1) Preparation work before passing through; (2) Give instruction to advance; (3) Inspect weapon equipment, ammunitions; (4) Inspect chemical, radioactive detection equipment; (5) Organize personnel to drink boiled water, take preventive medicines; (6) Conduct protection of personnel, equipment, rations, cooking utensils well; (7) Inspect and protect vehicles, guns; (8) Inspect and report preparation conditions to superiors up the chain of command; (9) Give order to advance; (10) Contents; (11) 1 General situations of contaminated areas; 2 Time of advancing and arrival as well as deployment positions; 3 Contact signals and related requirements of advancing; (12) Task before reaching borders of contaminated areas; (13) Give supplementary instructions; (14) Organize to further prepare for the passing through; (15) Inspect vehicles, close doors and windows of vehicles; (16) Actions of passing through contaminated areas; (17) Scout units check contamination conditions of routes for advancing; (18) Correctly grasp troops formation, separating distance and speed during transition; (19) Frequently inspect contamination conditions of personnel; (20) Maintain communications and contacts with the superiors; (21) Handle various situations assertively; (22) Formation; (23) Crosswind: echelon formation; tailwind, headwind: multiple columns; (24) Separating distance; (25) Personnel: about 3 meters; vehicles: not less than 100 meters; (26) Speed; (27) Generally advance at medium speed; advance at fast speed in severely contaminated areas.

XVI. Methods for Washing and Sterilizing Personnel

(1)区 分		(9)方 法
(2)消 除		(10)用清水擦洗身体受染部位或用毛巾、纱布、棉花干擦受染部位。
(3)消毒	(4)皮 肤	(11)先用棉花、布块吸去毒液，再用皮肤消毒液消毒。
	(5)眼口鼻	(12)可用2%的碳酸氢钠（即小苏打）水溶液冲洗、漱口、清洗
	(6)伤 口	(13)可用2%的碳酸氢钠或0.1%的高锰酸钾水溶液冲洗
(7)灭 菌		(14)先用灭菌剂擦拭受染部位，然后用清水冲洗干净。
(8)附 记		(15)上述方法即为局部洗消。当有条件时，再以肥皂水擦拭和用大量清水冲洗全身，即为全部洗消。对伤口要注意防水。

Key: (1) Classification; (2) Elimination; (3) Sterilization; (4) Skins; (5) Eyes, mouth, nose; (6) Wounds; (7) Disinfection; (8) Postscripts; (9) Methods; (10) Use clear water to wash contaminated body parts or use towels, gauze, cotton to scrub contaminated parts; (11) Use cotton, cloth to absorb toxic liquid first, then use skin disinfectant to disinfect; (12) 2% sodium bicarbonate water solution (i.e. small soda) may be used to rinse, gargle and wash; (13) 2% sodium bicarbonate or 1% potassium permanganate water solution may be used to rinse; (14) Use germicide to wipe contaminated parts first, then use clear water to wash clean; (15) The aforementioned methods are for local wash and sterilization. Whenever conditions permit, use soap water to scrub and a large amount of clear water to rinse the entire body, and this is thus for general wash and sterilization. Make effort to keep water from wounds.

XVII. Methods for Washing and Sterilizing Clothes

(1)区分		(11)方法
(2)消除	(3)拍打法	(12)迎风或侧风站立，从上到下拍打1—3遍
	(4)抖擞法	(13)侧风站立，提起受染服装的两肩或裤腰，用力向下抖甩。
	(5)水洗法	(14)同日常洗衣服，操作时应戴防毒手套、口罩，着塑料围裙。
(6)消毒	(7)擦拭法	(15)先用棉球吸去毒液，再蘸消毒剂涂擦，由里向外擦拭染毒部位2—3分钟，然后用水冲洗。
	(8)煮沸法	(16)将染毒服装放入锅内，煮沸0.5—2小时。
	(9)晾晒法	(17)将染毒服装悬挂，长时间晾晒、通风，使毒剂自然蒸发。
(10)灭菌		(18)将染毒服装放在沸水中蒸煮0.5—1小时，或用灭菌剂浸泡，毛皮与合成纤维用灭菌剂熏蒸。

Key: (1) Classification; (2) Elimination; (3) Method of patting; (4) Method of shaking and whisking; (5) Method of washing with water; (6) Sterilization; (7) Method of wiping; (8) Method of boiling; (9) Method of air-drying under the sun; (10) Disinfection; (11) Methods; (12) Stand facing the wind or crosswind, pat from the top to bottom 1 - 3 times; (13) Stand crosswind, hold both shoulders of contaminated clothes or waist of trousers and shake hard downward; (14) Same as washing clothes every day, antitoxic gloves, gauze mask and plastic apron should be worn when operating; (15) Use cotton swabs to absorb toxic liquid first, then wipe after soaking up with disinfectant. Wipe from the inside of contaminated parts toward the outside for 2 - 3 minutes, then wash with water; (16) Put the contaminated clothes into a pot to boil for 0.5 - 1 hour; (17) Hang contaminated clothes up, dry under the sun and ventilate for an extended length of time in order to make toxic agents evaporate naturally; (18) Put contaminated clothes into boiling water to boil for 0.5 - 1 hour, or soak them in disinfectant; use disinfectant to fumigate furs and synthetic fibers.

XVIII. Methods for Washing and Sterilizing Weapon Equipment

(1) 区分		(9) 方法
(2) 消除	(3) 扫刷法	(10) 利用扫帚、干草束对受染物体表面从上至下地向着一个方向扫刷。
	(4) 擦拭法	(11) 干擦：用布块、棉纱等顺一个方向多次擦拭。 湿擦：用布块、棉纱等蘸水或消除剂擦拭。
(5) 消毒	(4) 擦拭法	(12) 用布、棉纱、毛刷等蘸消毒液对武器装备表面擦拭。对木质、橡胶、塑料、皮革等松软材料，需适当增加消毒剂用量和消毒次数。精密仪器和机械（如手枪、望远镜）可用酒精、汽油或煤油擦拭。
(6) 灭菌	(7) 冲洗法	(13) 用水彻底冲刷，或用灭菌剂消毒后用清水冲洗，尔后擦干涂油。
	(8) 熏蒸法	(14) 对精密仪器和器材用灭菌剂熏蒸。

Key: (1) Classification; (2) Elimination; (3) Method of sweeping and brushing; (4) Method of wiping; (5) Sterilization; (6) Disinfection; (7) Method of rinsing; (8) Method of fumigating; (9) Methods; (10) Use a broom, dry straws to sweep and brush the surface of contaminated objects from top to bottom in one direction; (11) Dry-wipe: use pieces of cloth, gauze, etc. to wipe several times in one direction. Wet-wipe: use pieces of cloth, gauze, etc. soaked with water or disinfectant to wipe; (12) Wipe the surface of weapon equipment with cloth, gauze, brush soaked with disinfectant liquid. For soft materials such as wood, rubber, plastic, leather, etc., the dosage of disinfectant and number of times of sterilization must be increased appropriately. Precision instruments and machinery (e.g. hand gun, field glasses) may be wiped with alcohol, gasoline or kerosene; (13) Rinse and brush thoroughly with water, or rinse after being sterilized with germicide, then wipe dry and apply oil; (14) Use germicide to fumigate precision instruments and equipment.

XIX. Methods for Washing and Sterilizing Defense Works and Ground

区分		方法
消除	铲除法	由上风方向开始，先除去表层浮土，然后由近至远地铲除2—3厘米厚的土层。铲除时，不要扬尘，并将沾染物埋在对人员无害的地方。
	冲洗法	对坚硬的表面，用喷洒车或水泵按从上面下、从前到后、由里向外的顺序进行冲洗。
消毒	铲除法	将染毒层铲除掉。其厚度，土层4—7厘米，雪20—25厘米。铲除后，人员、工具要消毒。
	掩盖法	用未染毒的材料，掩盖染毒表面。其厚度，土、砂、炉碴10厘米，草皮、稻草10—15厘米。
	通风法	对工事内的染毒空气用通风或放风法排除。
	火烧法	无植物层地面，可按1—1.5公斤/米^{2}的标准铺干草，最好再洒上汽油等易燃液体（汽油夏季0.1—0.2升/米^2，冬季0.5—1升/米^2），由上风方向点火。注意消除周围易燃物。
	化学法	用消毒器材将消毒液均匀地布洒在染毒地面与毒剂起化学作用，从而达到消毒的目的。
灭菌	擦喷熏蒸	工事内用灭菌剂擦拭、喷洒或熏蒸，常用熏蒸剂有DDV或六六六。
	火冲铲除	地面可用三合二、漂白粉处理。还可用火烧、冲洗、铲除等方法灭菌。

Key: (1) Classification; (2) Elimination; (3) Method of shoveling; (4) Method of rinsing; (5) Method of covering; (6) Method of ventilating; (7) Method of burning; (8) Chemical method; (9) Disinfection; (10) Wipe, spray, fumigate; (11) Burn, rinse, shovel; (12) Methods (13) Start from upwind direction to eliminate surface soil first, then shovel 2 - 3cm thick of soil layer off starting from nearby places toward afar. When shoveling, do not kick up dust, bury contaminated objects at places that are harmless to personnel; (14) For hard surface, use spraying vehicles or water pumps to rinse in the sequence of from top to bottom, from front to rear and from inside to outside; (15) Shovel off the contaminated layer. Its thickness; soil layer 4 - 7cm, snow 20 - 25cm. After they are all shoveled off, personnel and tools must be sterilized; (16) Cover contaminated surface with uncontaminated materials. Its thickness: 10cm for soil, sand and slags, 10 - 15cm for grass and straw; (17) Use ventilating or forced air method to expel contaminated air inside defense works; (18) For ground surface without vegetations, dry straw may be spread according to the 1 - 1.5 kg/m^2 standard, and it is best to sprinkle flammable liquids

such as gasoline, etc. (use 0.1 - 0.2 liter of gasoline/m^2 in the summer, use 0.5 - 1 liter of gasoline/m^2 in the winter), then start the fire from upwind direction. Take note of eliminating surrounding flammable materials; (19) Use disinfection equipment to spread evenly the disinfectant liquid over contaminated ground to start chemical reactions with toxic agents, thereby reaching the goal of sterilization; (20) Wipe, spray or fumigate the inside of defense works with germicide. Frequently used fumigants are DDV oi 666; (21) Three-in-two, bleaching powder may be used to treat the ground. Disinfection methods such as buring, rinsing and shoveling, etc. may also be used.

XX. Methods for Washing and Sterilization Foods and Water

(1)区 分		(13) 方 法
消除(2)	(3)水 (4)沉淀法	4每升沾染水加粘土20克，朝一个方向搅动5分钟，静置15分钟后，可取用上层净水。
	(5)吸附混凝	5每升沾染水加净化剂一包，明矾适量，用木棒搅动3分钟，待澄清后取用净水。
	(6)过滤法	6自制滤水器，底部可放3厘米厚的草，草上、下各铺三层纱布或装厚度各为3厘米的石子、砂子，上面铺两层布或草，将水慢慢倒入过滤。
	(7)(11)粮食	7粒状粮食，先用扬簸法消除，然后用水淘洗两次。袋装面粉，可去掉表层沾染部分。包装好的食品，扫、擦、洗净表面即可食用。
	(8)副食(12)	8用洗、刷、刮、剥等方法消除表面沾染。
(9)消毒	蒸气毒(10)烟染毒	1)除去染毒表层，再用清水洗涤。对蒸气污染食物也可通风至毒剂气味消失。
	液滴染毒食物	20包装食品，先消毒外表，除去染毒部分，再通风处理。蔬菜、肉食，去掉表层，冲洗数次。
	3)水(21)	染毒的水一般不食用。
(灭(24)菌	2)食物(22)	可用蒸煮法或用灭菌药物处理。
	(23)3)水	煮沸5—10分钟即可饮用；集体饮用可用三合二或漂白粉处理；军用水壶中的水可放1至2片饮水消毒片，静置30分钟，即可饮用。

Key: (1) Classification; (2) Elimination; (3) Water; (4) Method of settling; (5) Adsorption, ccagulation; (6) Method of filtering; (7) Provisions; (8) Non-staple food; (9) Sterilization; (10) Steam, toxic smoke contamination; (11) Liquid droplets contaminated foods; (12) Foods; (13) Methods; (14) Add 20g of clay into each liter of contaminated water, stir in one direction for 5 minutes, and after leaving undisturbed for 15

minutes, the top clean water may be consumed; (15) Add 1 bag of purificant and an appropriate amount of alum into each liter of contaminated water, stir with a wooden rod for 3 minutes, clean water may be consumed after it clears; (16) Home-made filtering device, put 3cm thick of grass at its bottom, place 3 layers of gauze on either side of the grass or put a layer of 3cm thick of pebbles and sand on either side and place 2 layers of cloth or grass on top, then pour water slowly into it to be filtered; (17) Grain-shaped foods are first sieved, then washed with water twice. Contaminated surface portion of bagged flour may be removed. Packaged foods may be eaten after their surfaces have been swept, wiped and washed clean; (18) Eliminate surface contamination by employing methods such as washing, brushing, scraping and peeling, etc.; (19) Remove contaminated surface layer, then wash with clean water. Vapor contaminated foods may also be ventilated until the odor of the toxic agent disappear; (20) Surfaces of packaged foods may be sterilized first, eliminate contaminated portion, then go through the ventilation treatment. Remove the surface layers of vegetables and meat, and rinse several times; (21) Contaminated water is generally not to be consumed; (22) Steam/boil method may be used or treat with germicides; (23) May be consumed after being boiled for 5 - 10 minutes; for group consumption, it may be treated with three-in-two or bleaching powder; water inside military canteen may be consumed after putting 1 to 2 tablets of drinking water disinfection pill and being left undisturbed for 30 minutes; (24) Disinfection.

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